



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

Address: No. 19, Hezun N. Rd., Zhongli Dist., Taoyuan City 320, Taiwan (R.O.C.)

Tel: +886-3-4529998 Fax: +886-3-4522866

Suzhou Shengyih Electronics Plastic Co. Ltd (Shou Zhou)

聲億電子塑膠有限公司 (蘇州廠)

Address: A10, Suzhou Creek Business District, 169 Changhong North Road, Luzhi Town, Wuzhong District, Suzhou Province, China

Tel: +86-512-65046030 Fax: +86-512-65046033

Shengyih Electronic Co. Ltd (Dongguan)

聲億電子有限公司 (東莞廠)

Address: Mu-Lun Administration Area, Changping Town, Dongguan City, Guangdong Province, China

Tel: +86-769-83914045 Fax: +86-769-83914046

Shengyih Electronic Co. Ltd (Dongguan)

聲毅電子有限公司 (東莞廠)

Address: No.3, West Shahukou Industrial Park, Changping Town, Dongguan city, Guangdong Province, China

Tel: +86-769-38983288 Fax: +86-769-38852280



Table of Contents

Item

1. Antenna Specifications

-Drawing

2. Packing

-PE Bag

-Carton

3. Test Report

-Electrical test

-Antenna Efficiency

-Pattern test

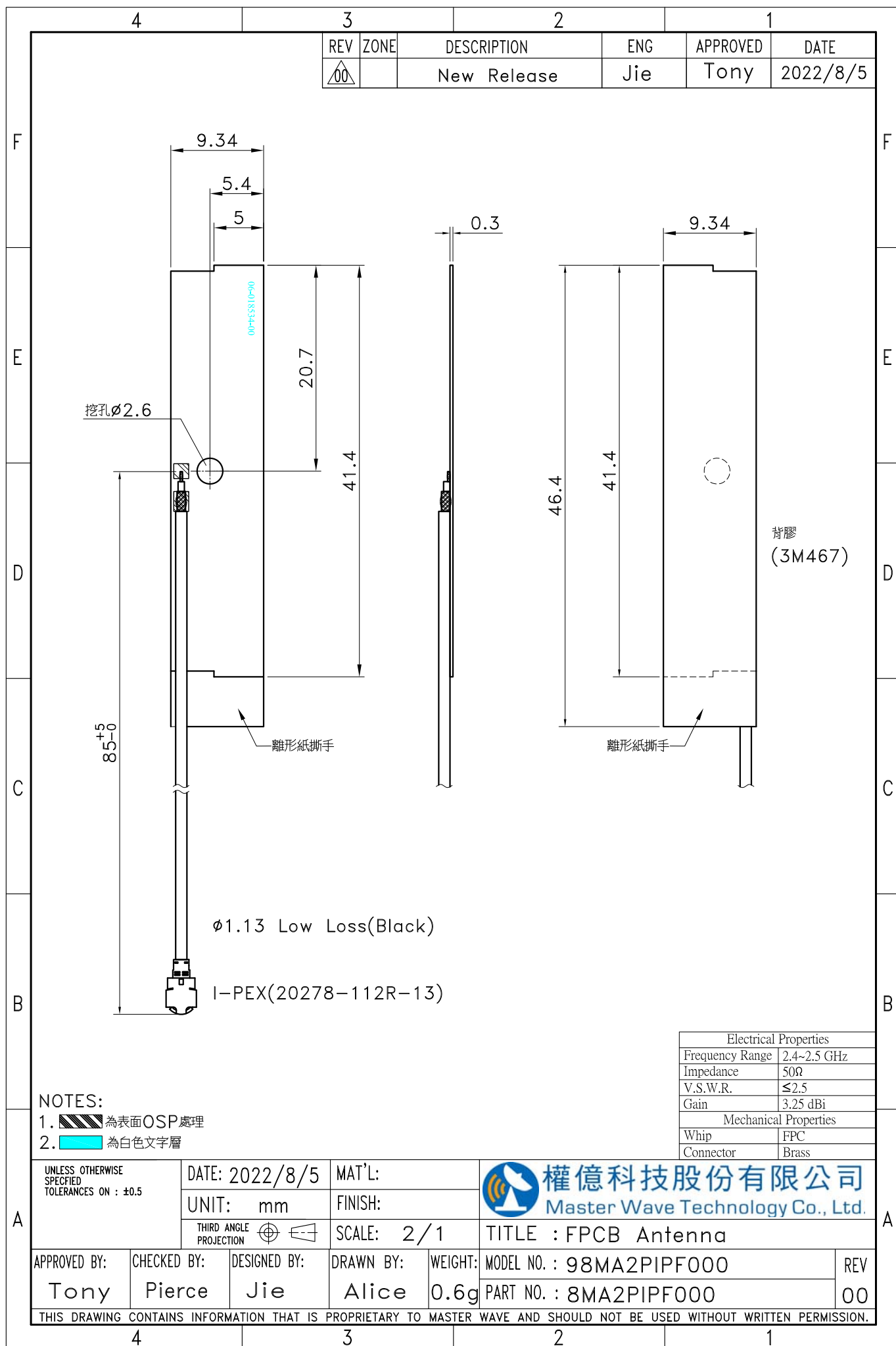
4. Material Certifications

-Connector

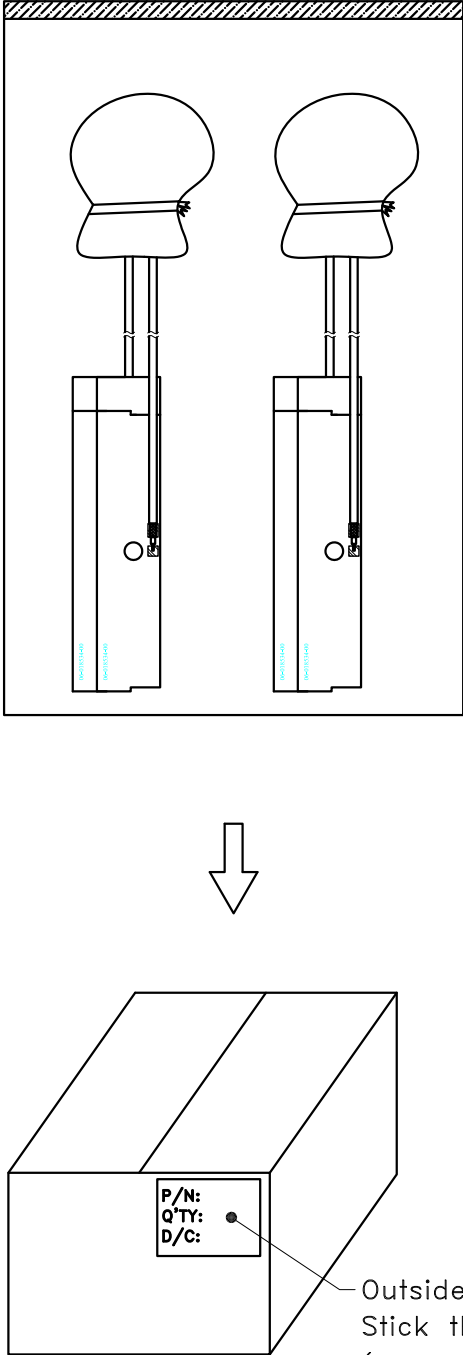
-Cable

Modification History:

REV.	Date	Content
00	2022.08.05	



4		3		2		1		
		REV	ZONE	DESCRIPTION		ENG	APPROVED	DATE



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)

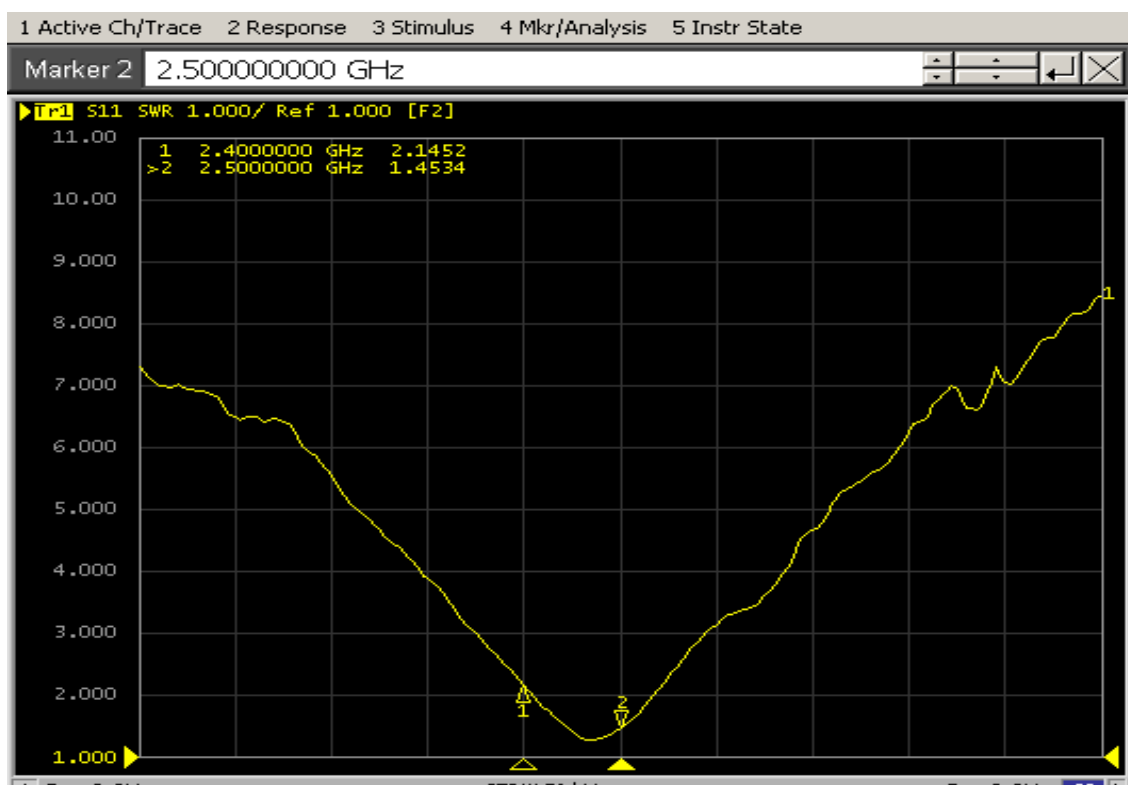
Outside the carton:
Stick the label on the side mark
(將標籤黏貼於外箱側麥)

		DATE: 2022/8/5		MAT'L:		 權億科技股份有限公司 Master Wave Technology Co., Ltd.	A					
		UNIT: mm		FINISH:								
APPROVED BY: Tony		CHECKED BY: Pierce		DESIGNED BY: Jie		DRAWN BY: Alice		WEIGHT:		TITLE : FPCB Antenna Packing		REV 00
										MODEL NO. : 98MA2PIPF000		
								PART NO. : 8MA2PIPF000				

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



Electrical Test





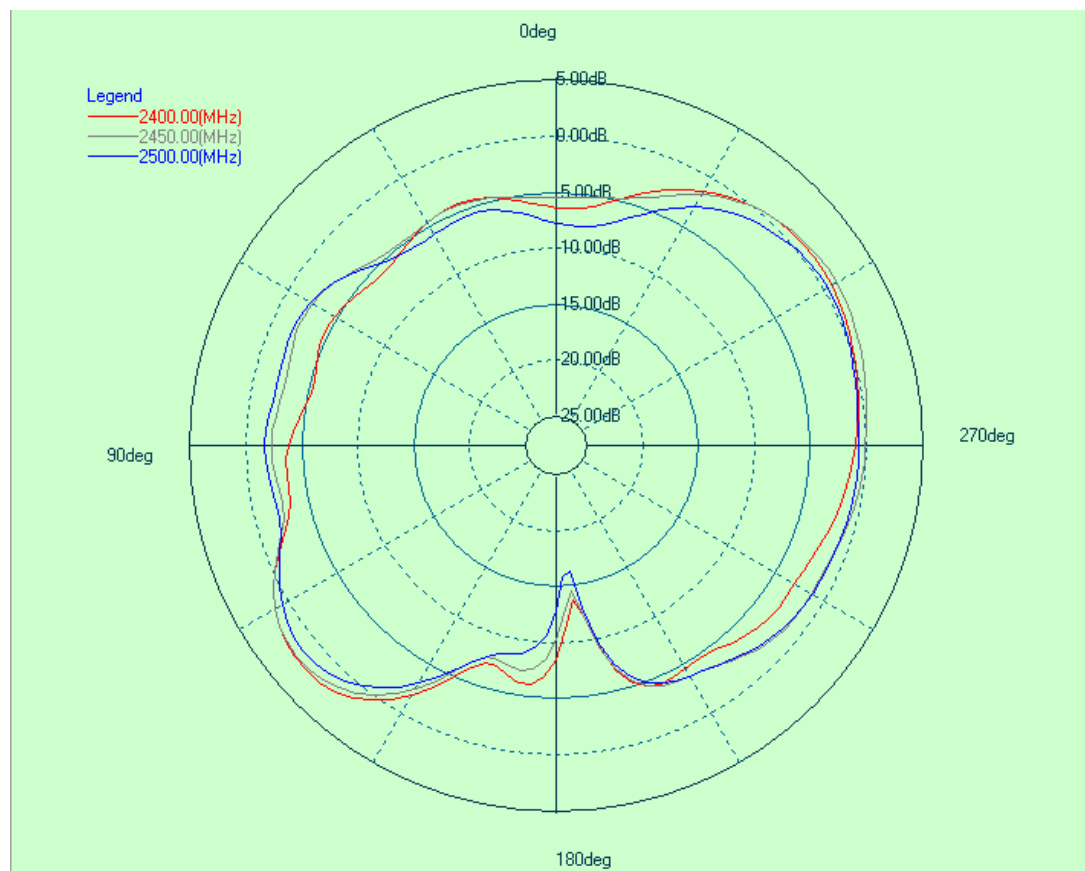
Antenna Efficiency

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

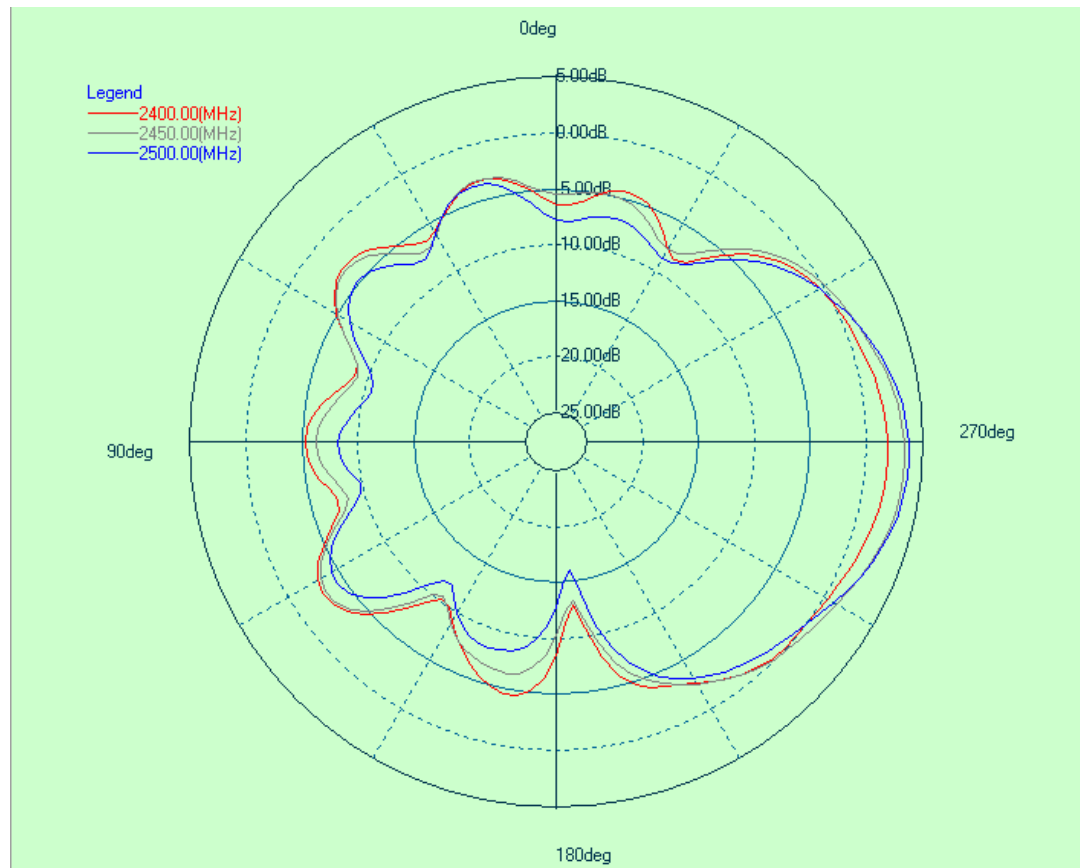
XZ Plane





2D Radiation Pattern

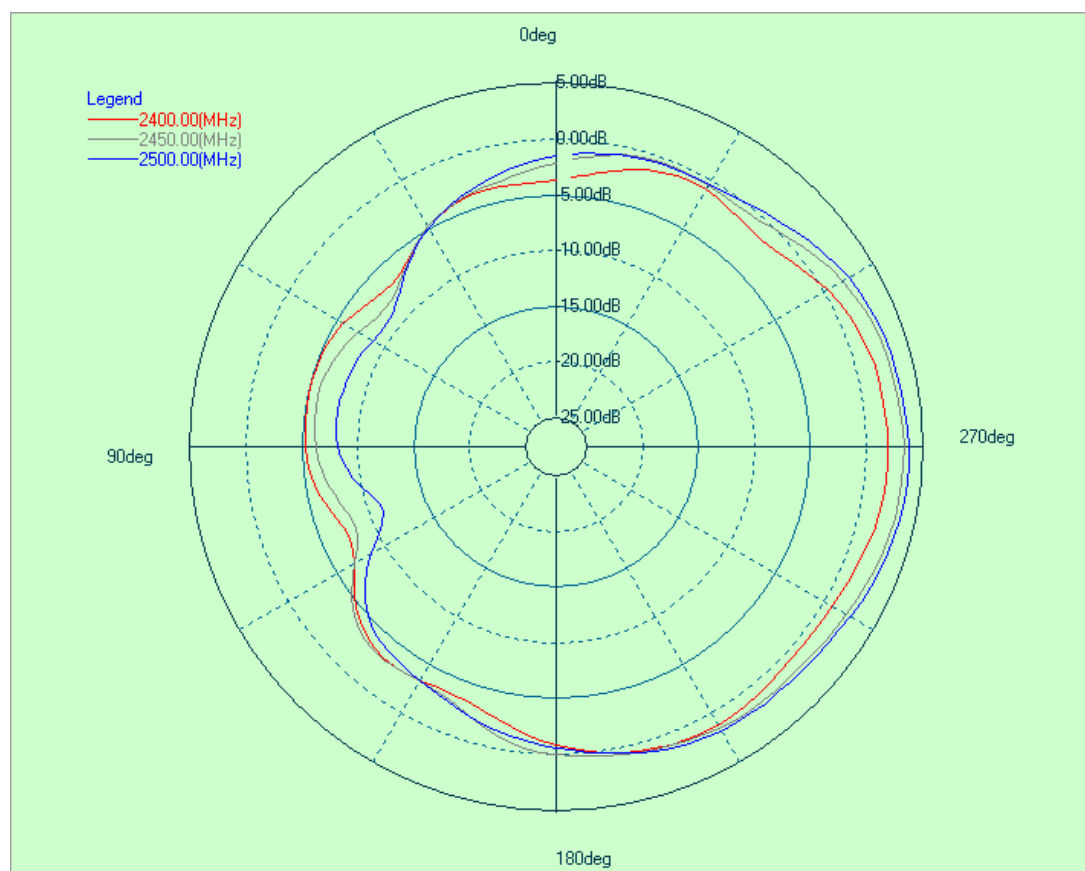
YZ Plane





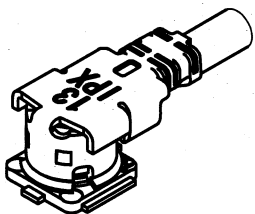
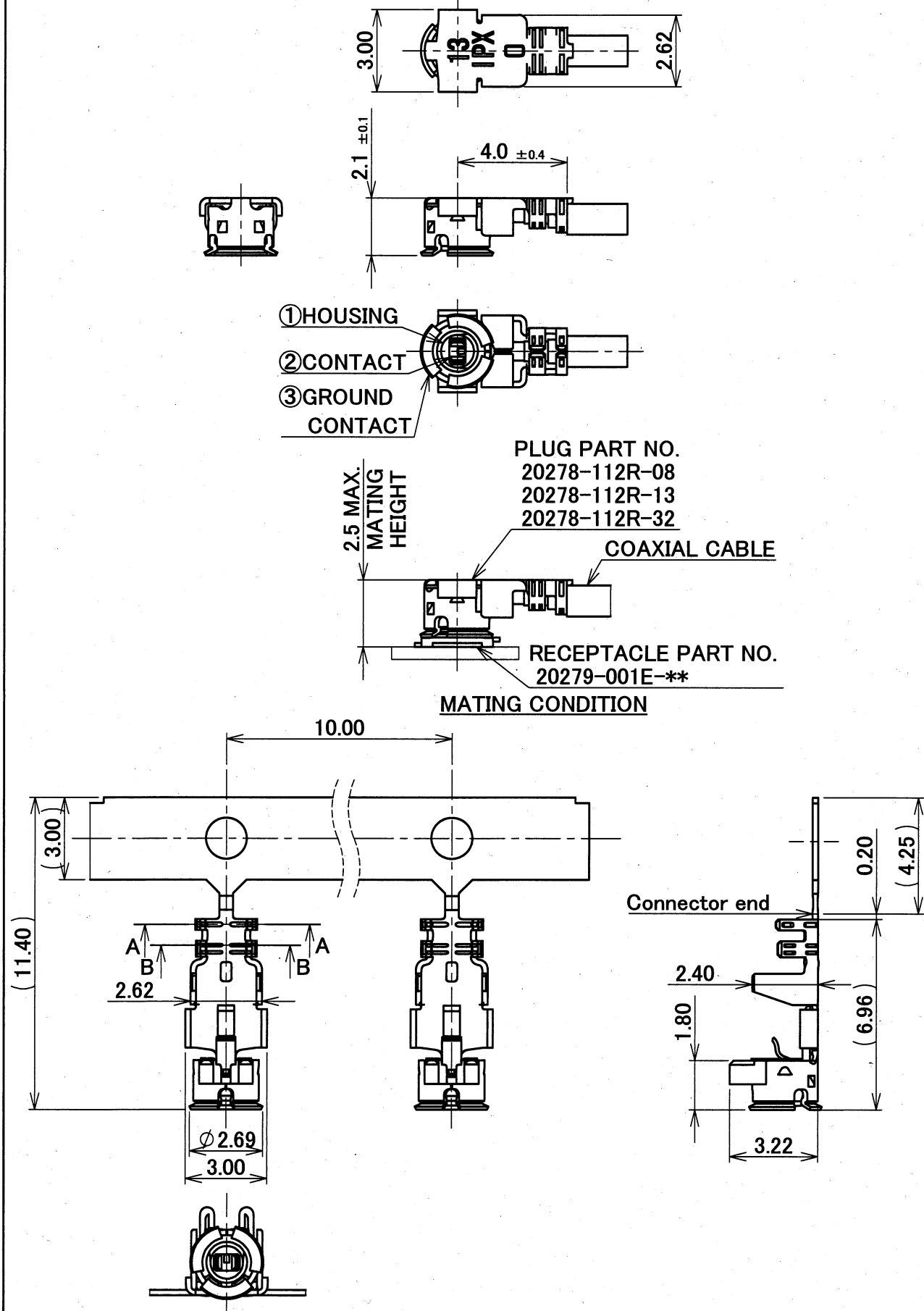
2D Radiation Pattern

XY Plane



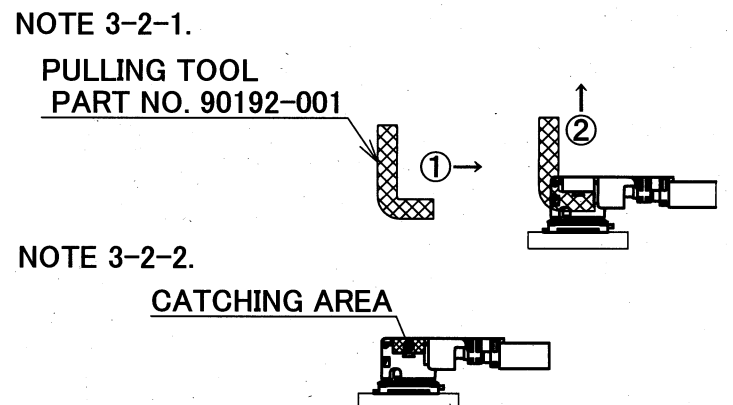
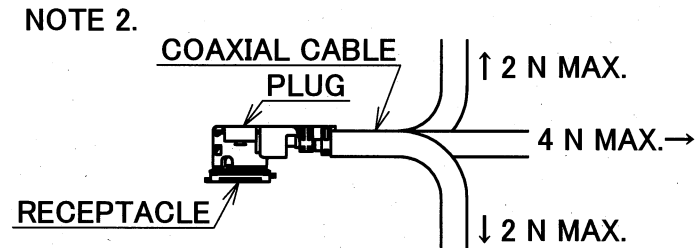
Recommended P/N 20278-112R-**-**

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

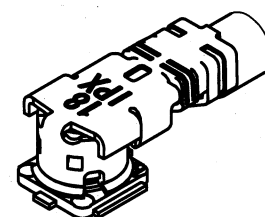
1. APPLICABLE CONNECTOR:
20279-001E-**, 20314-001E-01, 20431-001E-01, 20441-001E-01
2. PERMISSIBLE LOAD OF CABLE AT MATING
3. SUGGESTIONS FOR MATING & UNMATING OPERATION.
 - 3-1. MATING
PLEASE MATE THE CONNECTOR STRAIGHTLY TO VERTICAL DIRECTION AS MUCH AS POSSIBLE, ADJUSTING THE MATING AXIS OF PLUG AND 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 μ m MIN. CONTACT PART Au 0.05 μ m MIN.
2	CONTACT	PHOSPHOR BRONZE	ALL OVER Ni 1.00 μ m MIN. CONTACT PART Au 0.10 μ m MIN.
1	HOUSING	PBT	UL94V-0, 20278-112R-08: WHITE 20278-112R-13, -32: BLACK

26	Z181428	M.N	2018/11/01	Ken	ANGLE	$\pm 2^\circ$	6 OVER 30 MAX.	± 0.3	PROJECTION	SERIES No.	CUSTOMER COPY
25	Z180342	M.N	2018/03/27	Ken	6 MAX.	± 0.2	30 OVER 120 MAX.	± 0.5		R15	
24	Z171151	M.A	2017/10/05	T.M	GENERAL TOLERANCE.				TITLE		SCALE
23	Z150949	K.T	2015/08/31	Tom	DWG.		DATE		MHF-1		5:1
22	Z150615	Tad	2015/06/04	Tom	CHK.		DATE		PLUG (Au TYPE)		UNIT
21	Z131052	T.S	2013/11/15	Tom	APP.		DATE				mm
REV.	ECN	BY	DATE	APP.	APP.		DATE		DWG. No.	20278	SIZE
REVISION RECORD					K.Katabuchi		2001/07/13				A3
										SHEET	1/6
										REV.	26

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.

7-2-2. 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.

7-3. CRIMP OVER STANDARDS OF OUTER CONDUCTOR

STANDARDS: LESS THAN 10% FROM TOTAL NUMBERS OF OUTER CONDUCTOR.

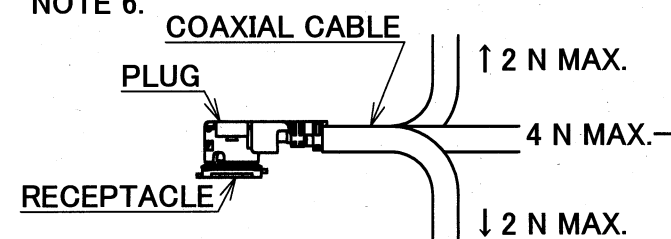
(NUMBERS OF OUTER CONDUCTOR'S CRIMP OVER FROM OUTER CONDUCTOR'S BARREL)

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.

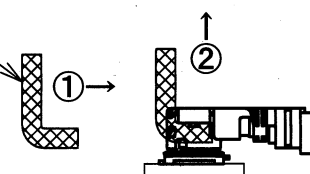
8. THIS IS "PB-FREE" CONNECTOR.

NOTE 6.



NOTE 7-2-1.

PULLING TOOL
PART NO. 90192-001



NOTE 7-2-2.

CATCHING AREA



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

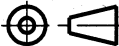
						ANGLE	±2°	6 OVER 30 MAX.	±0.3		SERIES No. R15	CUSTOMER COPY			
						6 MAX.	±0.2	30 OVER 120 MAX.	±0.5						
REVISION RECORD						GENERAL TOLERANCE.				TITLE MHF® I PLUG (Au TYPE)		SCALE			
						DWG.		DATE				5:1			
						CHK.		DATE		UNIT					
						APP.		DATE		mm					
						REV.		ECN		BY		DATE			APP.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

DAI-ICHI SEIKO CO., LTD.

KQE-DFFDE06-02 REV.11

Confidential C

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℃~+90℃)
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					
DWG.	DATE					5:1					
CHK.	DATE					UNIT					
APP.	DATE					mm					
				DWG. No.		SIZE	SHEET 3/6 REV. 26				
				20278		A3					

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		90187-008C	90187-013C	90187-032C	90233-018
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

CABLE CUT LENGTH

CRIMP HEIGHT BLADE MICROMETER

CH-1

i-Fit® PART

CH-2

OUTER CONDUCTOR PART

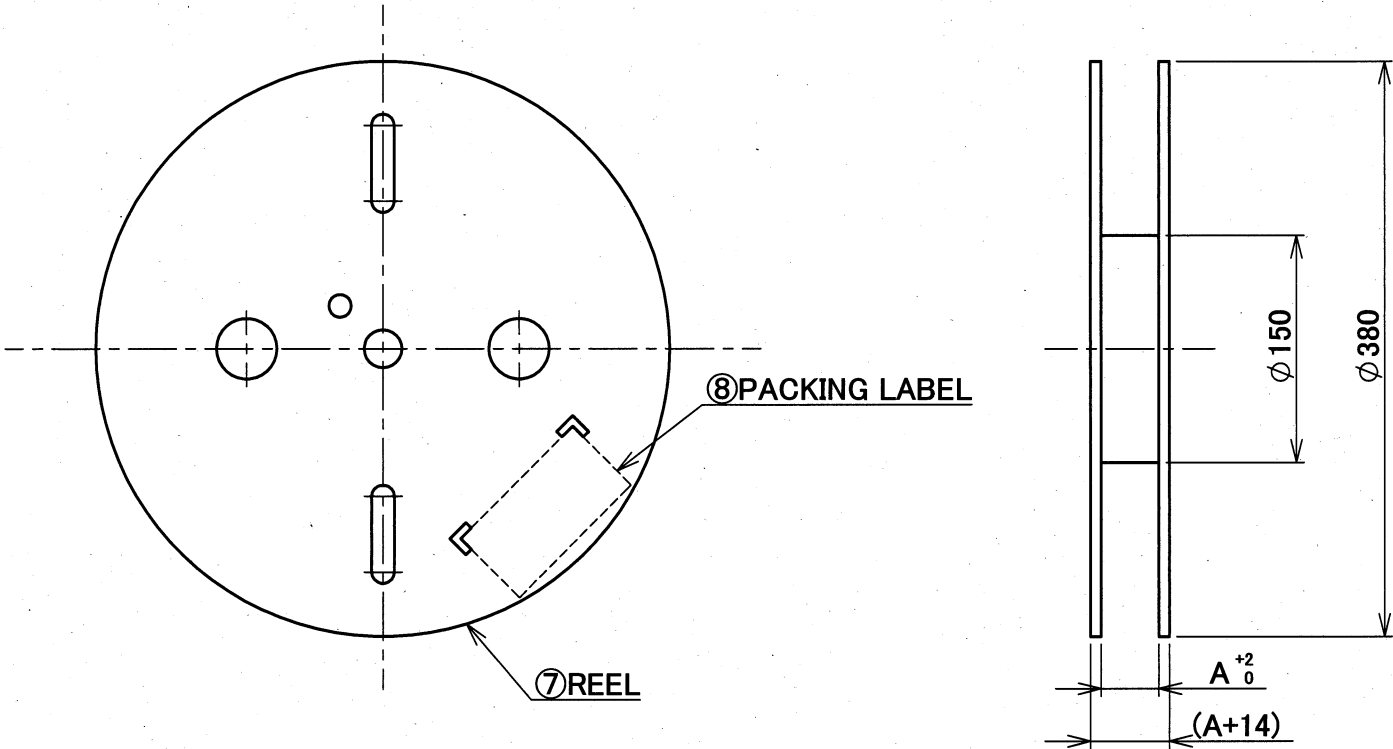
CH-3

JACKET PART

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

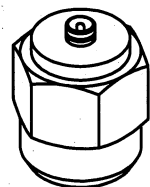
NOTE 9. MUST NOT USE SOLDER COATED INNER CONDUCTOR AND OUTER CONDUCTOR.

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

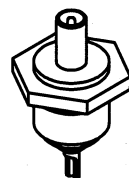


8	PACKING LABEL	-	-
7	REEL	CB	-
NO.	DISCRIPTION	MATERIAL	FINISH , REMARKS

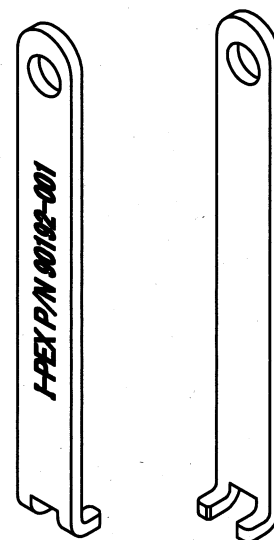
ANGLE	±2°	6 OVER 30 MAX.	±0.3	PROJECTION 	SERIES No. R15	CUSTOMER COPY		
6 MAX.	±0.2	30 OVER 120 MAX.	±0.5					
GENERAL TOLERANCE.				TITLE MHF® I PLUG (Au TYPE)		SCALE		
DWG.	DATE					-		
CHK.	DATE					UNIT		
APP.	DATE					mm		
				DWG. No.		SIZE	SHEET 5/6 REV. 26	
				20278		A3		



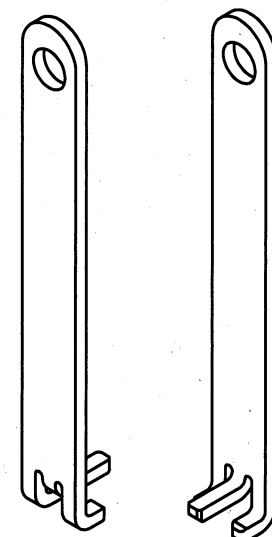
MHF I/II SMA ADAPTOR
PART NO. 90193-001



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



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



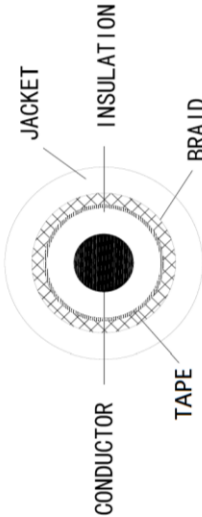
FRONT SIDE BACK SIDE
MHF I PUSHING AND PULLING TOOL
PART NO. 90224-001

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		
DWG.	DATE					2:1		
CHK.	DATE					UNIT		
APP.	DATE					mm		
				DWG. No.	20278	SIZE	SHEET 6/6	
						A3	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				
	NOM.O.D(mm)	0.73±0.05				
TAPE	MATERIAL	Copper Mylar Tape				
	Composition(mm)	Vertical Wrapping the Copper Mylar Tape of 0.015				
BRAID	MATERIAL	Tinned annealed copper wire				
	Composition(mm)	Single Braid of 0.05				
	MATERIAL	FEP(*color)				
JACKET	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℃)						
Item		Unit	Details	Characteristic Impedance		Ω
Conductor Resistance		Ω/km	Max.581	Attenuation		dB/m
Insulation Resistance		MΩ.km	Min.500			
Dielectric Strength		V(AC)/min	500			
Capacitance		pF/m	98			
REMARK				Temperature range	℃	
				Standing wave(0-6GHz)	/	
				Rating Voltage	V	
					30	
MASTER WAVE TECHNOLOGY CO., LTD.						
CHECKED				DATE	2020/8/26	
DRAWING				REV	B	