

# APPROVAL SHEET

CUSTOMER：神腦國際企業股份有限公司  
SENAO INTERNATIONAL CO., LTD.

MODEL NO.：IWM-144G-101(Rev.01)

DESCRIPTION：2.4GHz Tri-Band Flying Lead (Core)  
Swivel Antenna

Customer Approval

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|



士誼科技事業股份有限公司  
**JOYMAX ELECTRONICS CO.,LTD.**

桃園縣中壢市中壢工業區東園二路5號  
No.5,Dong Yuan Rd. 2, Jhongli Industrial Park,  
Jhongli City, Tao Yuan, Taiwan, R.O.C.  
Tel:+886-3-4335698 Fax:+886-3-4335798  
E-Mail：ericlai@joymax.com.tw

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**1.Description:**

The antenna is a flying lead swivel and  $1/4 \lambda$  dipole antenna. It's useful for the ISM Band of 2.4~2.5 GHz.

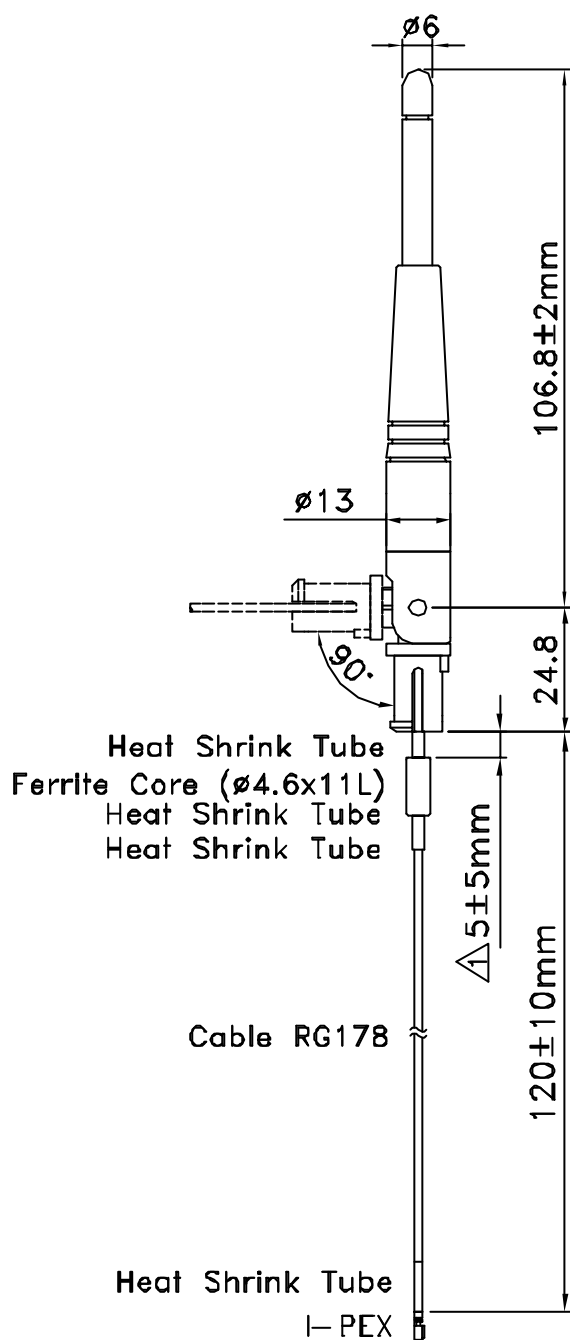
**2. Electrical Properties**

|                          |                      |
|--------------------------|----------------------|
| 2-1 Frequency Range..... | 2.4~2.4835GHz        |
| 2-2 Impedance.....       | 50 Ohms nominal      |
| 2-3 S.W.R. ....          | $\leq 2.0$           |
| 2-4 Return Loss.....     | $\leq -10$ dB        |
| 2-5 Gain.....            | 2 dBi                |
| 2-6 Polarization.....    | Vertical             |
| 2-7 Admitted Power.....  | 1W                   |
| 2-8 Electrical Wave..... | $1/4 \lambda$ Dipole |

**3. Mechanical Properties :**

|                              |                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 3-1 Connector.....           | I-PEX MHF                                                                                                                  |
| 3-2 Cable.....               | RG178                                                                                                                      |
| 3-3 Antenna Cover.....       | Polyurethane                                                                                                               |
| Antenna Base.....            | Polycarbonate                                                                                                              |
| 3-4 Ferrite Core.....        | RH-04                                                                                                                      |
| 3-5 Rotating Test.....       | 1.0 Kg-cm, After 2000 cycles with the<br>rate of 30 cycles/minute (max.). It shall<br>be possible to remain it's position. |
| 3-6 Attachment Strength..... | 2.0 Kg (30 minutes)                                                                                                        |





| TOLERANCES: |        |
|-------------|--------|
| X           | ± 1    |
| X.X         | ± 0.5  |
| X.XX        | ± 0.25 |
| ANG.        | ± 2.0° |

|                 |                              |                  |                       |         |     |
|-----------------|------------------------------|------------------|-----------------------|---------|-----|
| REV DESCRIPTION | ① Move Core Position<br>50→5 | MATERIAL         | MODEL: IWM-144G-101   |         |     |
|                 |                              | FINISH           | NAME: Swivel Antenna  |         |     |
|                 |                              | UNIT: mm         | PART No: IWM-144G-101 |         |     |
|                 |                              | SCALE: 1/ 1.5    | DESIGN                | APPROVE | REV |
|                 |                              | DATE: 12/15/2003 | Meg Lee               |         | 01  |

QP0502-01-02

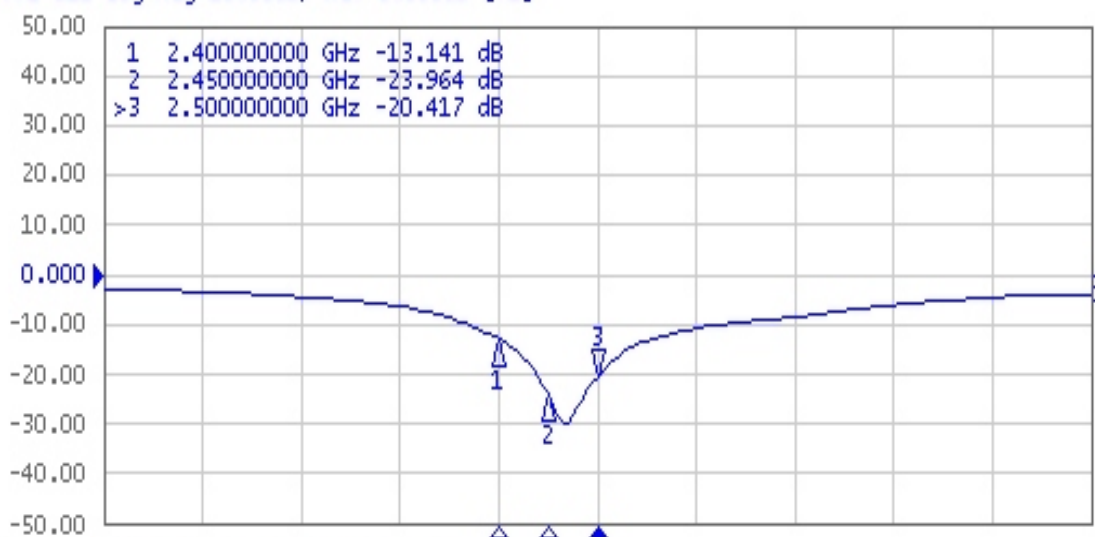


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**Return  
Loss**

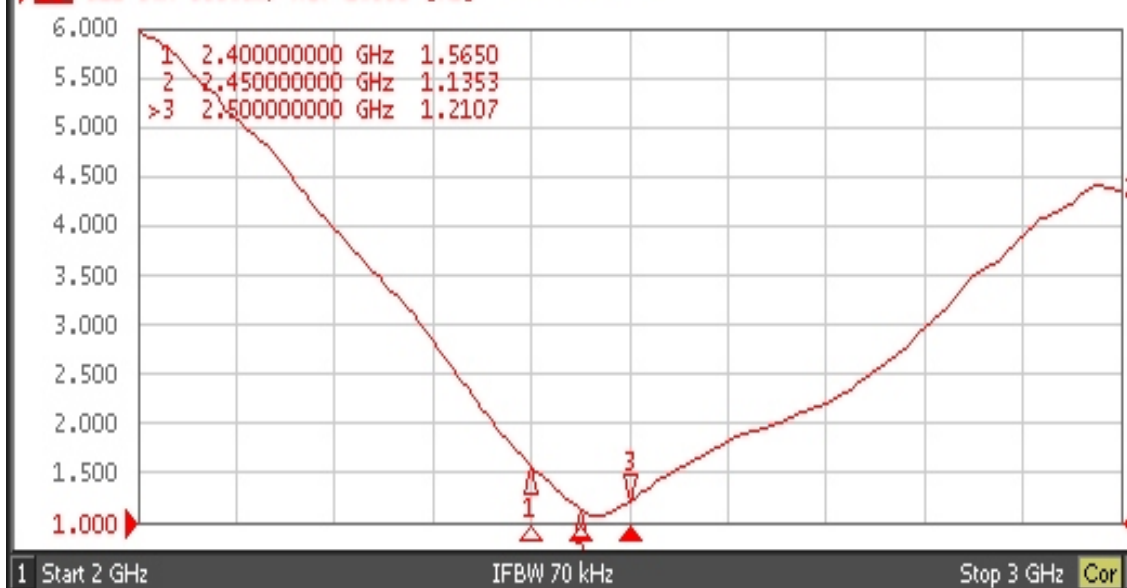
Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB [F1]

|    |             |     |         |    |
|----|-------------|-----|---------|----|
| 1  | 2.400000000 | GHz | -13.141 | dB |
| 2  | 2.450000000 | GHz | -23.964 | dB |
| >3 | 2.500000000 | GHz | -20.417 | dB |

**S.W.R.**

Tr2 S11 SWR 500.0m/ Ref 1.000 [F1]

|    |             |     |        |
|----|-------------|-----|--------|
| 1  | 2.400000000 | GHz | 1.5650 |
| 2  | 2.450000000 | GHz | 1.1353 |
| >3 | 2.500000000 | GHz | 1.2107 |



1 Start 2 GHz

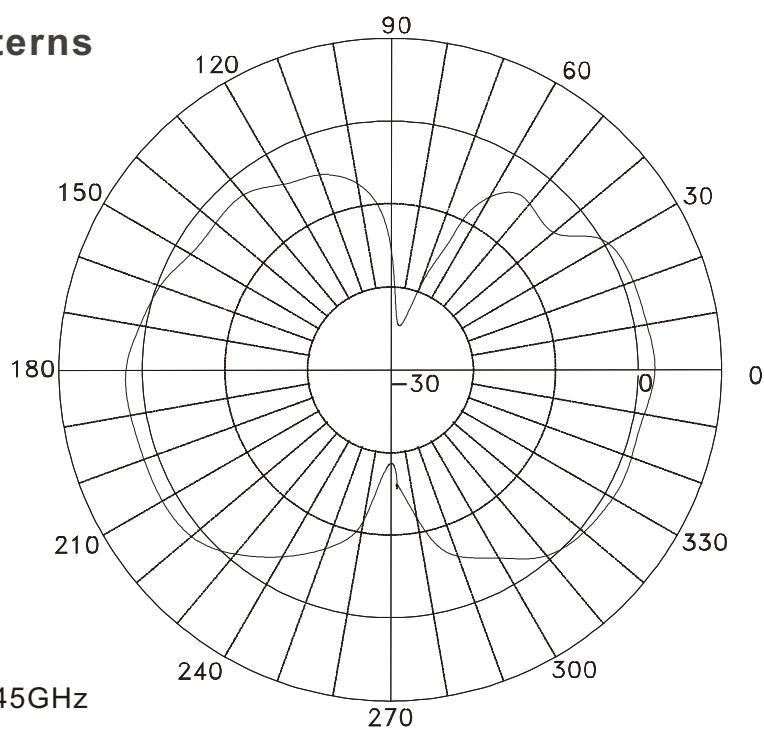
IFBW 70 kHz

Stop 3 GHz

Cor !

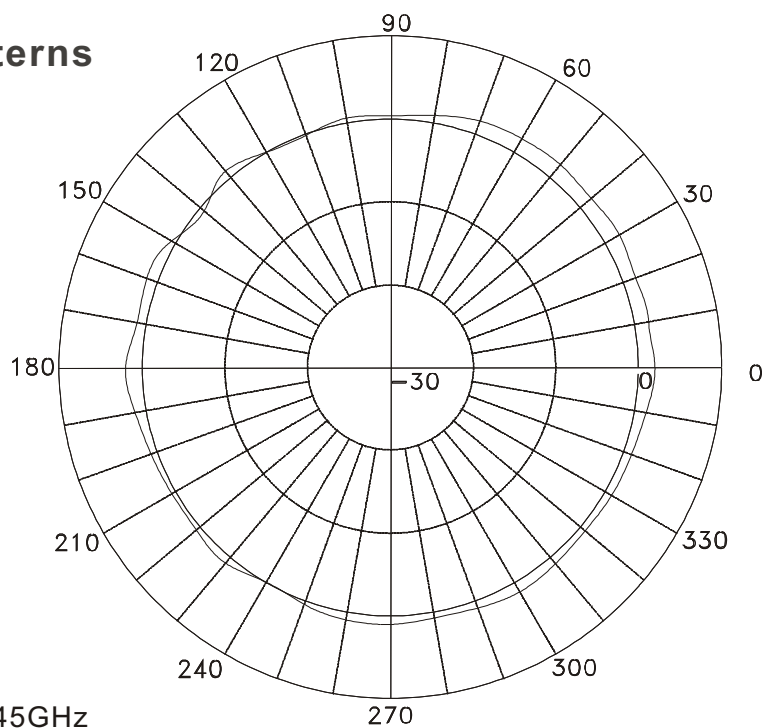


### E-Plane Field Patterns



Frequency: 2.45GHz

### H-Plane Field Patterns



Frequency: 2.45GHz



| PART NO.                                                                                                                                                                                                                         |  | Notes                                                                                                               |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------|--|
| 1. Material                                                                                                                                                                                                                      |  | 1. 材料                                                                                                               |  |
| (1) Housing : PBT, UL94V-0, black                                                                                                                                                                                                |  | (1) ハウジング : PBT, UL94V-0, 黒色                                                                                        |  |
| (2) Contact : phosphor bronze, gold plating                                                                                                                                                                                      |  | (2) コンタクト : リン青銅, 金メッキ                                                                                              |  |
| (3) Ground contact : phosphor bronze, gold plating                                                                                                                                                                               |  | (3) グランドコンタクト : リン青銅, 金メッキ                                                                                          |  |
| 2. Packing : reel                                                                                                                                                                                                                |  | 2. 梱包 : リール                                                                                                         |  |
| 3. Mating partner part No. : 20279-001E-01                                                                                                                                                                                       |  | 3. かん合相手 Part No. : 20279-001E-01                                                                                   |  |
| 4. Permissible load of cable at mating                                                                                                                                                                                           |  | コネクタかん合後のケーブルに対する荷重                                                                                                 |  |
|                                                                                                                                                                                                                                  |  |                                                                                                                     |  |
| 5. Suggestions for mating & unmating operation.                                                                                                                                                                                  |  | 5. コネクタかん合時および抜き時の注意                                                                                                |  |
| 5-1 Mating.<br>Please mate the connector straightly to vertical direction as much as possible, adjusting the mating axis of plug and receptacle.<br>As excessive slant angle mating may break the connector, please don't do it. |  | 5-1 コネクタ挿入時<br>PlugとReceptacleのかん合を合わせ、できるだけ垂直に挿入して下さい。<br>極端な斜め挿入は行わないで下さい。<br>コネクタ破損の原因となりますので、過度なこじり挿入は行わないで下さい。 |  |
| 5-2 Unmating.<br>(1) In case of unmating by pulling tool.<br>Please use the pulling drawing, and please pull plug to vertical direction as directly as possible.                                                                 |  | 5-2 コネクタ抜き時<br>(1) 抜きジクを用いる場合<br>下図のようなどきだけ垂直に引き抜いて下さい。                                                             |  |
|                                                                                                                                                                                                                                  |  |                                                                                                                     |  |
| (2) In case of unmating directly by hand<br>Please catch the catching area of plug, and please pull plug to vertical direction as directly as possible.                                                                          |  | (2) 手で直接引き抜く場合<br>下図の保持部をつかみ、できるだけ垂直に引き抜いて下さい。                                                                      |  |
|                                                                                                                                                                                                                                  |  |                                                                                                                     |  |
| GENERAL TOLERANCE                                                                                                                                                                                                                |  | 1106560000                                                                                                          |  |
| 6 MAX. ±0.2                                                                                                                                                                                                                      |  | I-PEX                                                                                                               |  |
| 6 OVER MAX. 30 ±0.3                                                                                                                                                                                                              |  | Interconnect and Packaging Electronics TOKYO, JAPAN                                                                 |  |
| 30 OVER MAX. 120 ±0.5                                                                                                                                                                                                            |  | TITLE MHF series micro coaxial connector plug vertical                                                              |  |
| ANGLE ±2                                                                                                                                                                                                                         |  | CUSTOMER COPY                                                                                                       |  |
|                                                                                                                                                                                                                                  |  | DESIGN D BY DATE                                                                                                    |  |
|                                                                                                                                                                                                                                  |  | CHK D BY DATE                                                                                                       |  |
|                                                                                                                                                                                                                                  |  | APP D BY DATE                                                                                                       |  |
|                                                                                                                                                                                                                                  |  | REV E CN BY DATE APP                                                                                                |  |
|                                                                                                                                                                                                                                  |  | REV. RECORD                                                                                                         |  |
|                                                                                                                                                                                                                                  |  | SERIES No. 2814                                                                                                     |  |
|                                                                                                                                                                                                                                  |  | PROJECTION SCALE UNIT                                                                                               |  |
|                                                                                                                                                                                                                                  |  | DWG. No. 20278                                                                                                      |  |
|                                                                                                                                                                                                                                  |  | SHEET REV. 2/2 2                                                                                                    |  |



| Rev | Change         | By  | Date     |
|-----|----------------|-----|----------|
| A   | General Update | MTP | 03/04/02 |

**Construction:**

A) Center Conductor:  
30 7/38 SPCW\*  
OD .012" ± .001"

B) Dielectric:  
Extruded PTFE  
OD .033" ± .002"

C) Shield:  
38 AWG SPC\*  
OD .051" Nom.

D) Jacket:  
FEP - Brown Tint  
OD .071" ± .004"

Surface Printed:  
"RG178HF HARBOUR INDUSTRIES 27478"

**Electricals:**

Impedance:  
50 ± 2 Ohms

Capacitance:  
32 pF/ft Max.

Velocity of Prop.:  
70% Nom.

Cut off Frequency:  
116 GHz

VSWR(10 - 6.0 GHz):  
1.20:1 Mean

Ramp Function:  
0.10GHz: 1.10:1  
6.00GHz: 1.40:1

**Physical Properties:**

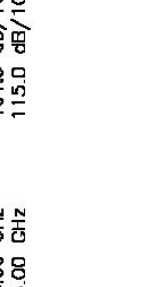
Weight per 1000 ft:  
6.3 lbs Max.

Minimum Bend Radius:  
.35"

Operating Temperature Range:  
-55°C to 200°C

Conductor Break Strength:  
4.6 lbs.



**Attenuation:**

0.10 GHz  
14.0 dB/100ft.

0.40 GHz  
28.2 dB/100ft.

1.00 GHz  
45.0 dB/100ft.

2.00 GHz  
64.4 dB/100ft.

2.45 GHz  
71.6 dB/100ft.

3.00 GHz  
79.7 dB/100ft.

4.00 GHz  
92.7 dB/100ft.

5.00 GHz  
104.3 dB/100ft.

6.00 GHz  
115.0 dB/100ft.

**Harbour Industries**

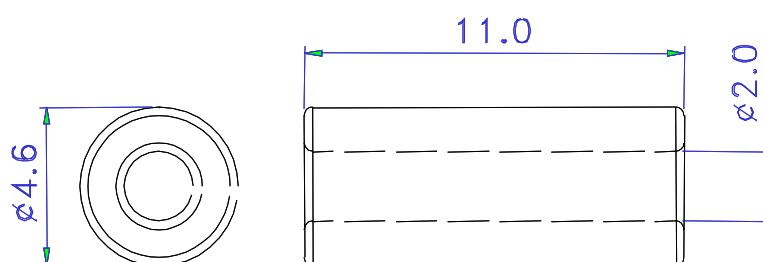
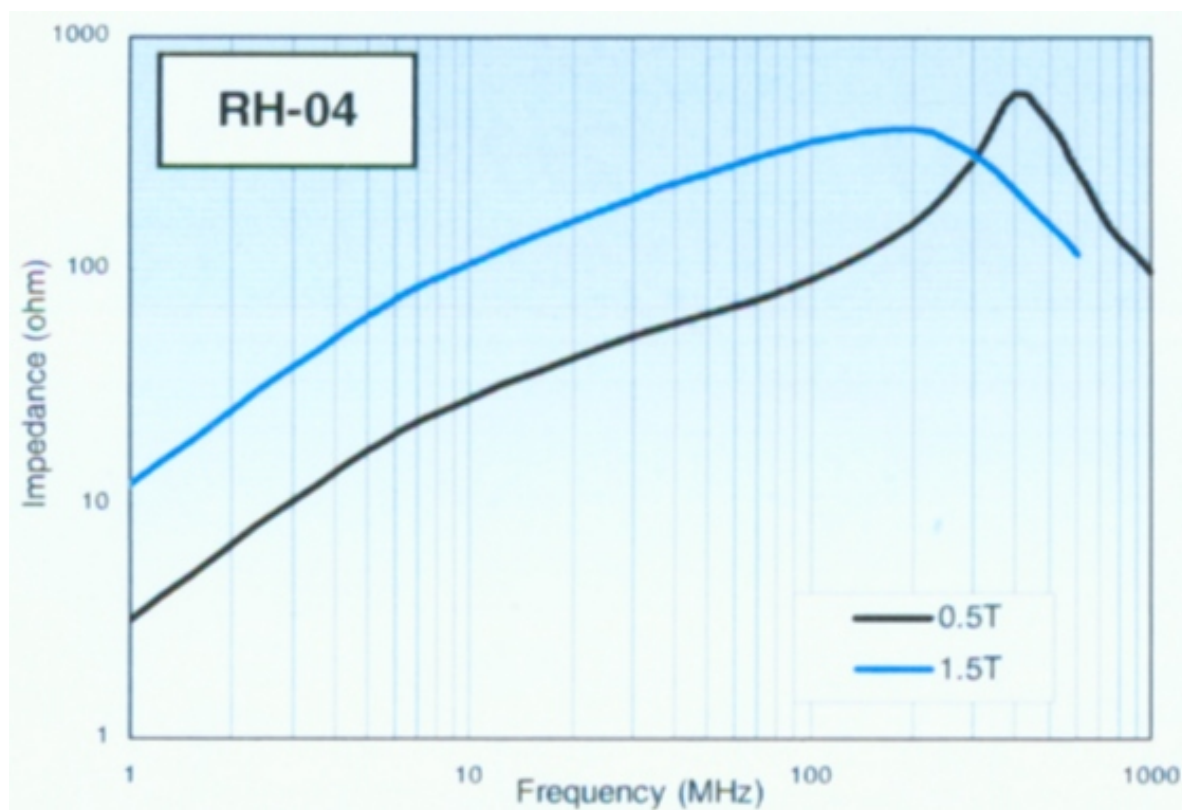
| Date:    | Scale: | Drawn By: | Approved By: | Rev: | Sheet  |
|----------|--------|-----------|--------------|------|--------|
| 12/17/01 | None   | MTP/Inner | MTP          | A    | 1 of 1 |

Drawing Name:  
RG178HF

Part Number:  
TBD

Drawing Number:  
121701-1

\* Silver plating thickness is a minimum of 40µ".  
Per MIL-C-17 and ASTM B298.



RH-04-Core

