

Measurement of Maximum Permissible Exposure

1. Foreword

In adopt with the Human Exposure IEEE C95.1, and according to the FCC 1.1310. The *Maximum Permissible Exposure (MPE)* is obligated to measure in order to prove the safety of radiation harmfulness to the human body.

The *Gain* of the antenna used is measured in an *anechoic chamber*. The *maximum total power to the antenna* is to be recorded. By adopting the *Friis Transmission Formula* and the *power gain of the antenna*, we can find the distance right away from the product, where the limit of the MPE is.

2. Description of EUT

- Granted FCC ID** : NHPWLB2203
- Product name** : IEEE 802.11b Wireless LAN Broadband Router
- Model name** : as Appendix A of Test Report
- Classification** : Mobile Device
- (i) Under normal use condition, the antenna is at least 20cm away from the user;
 - (ii) Warning statement for keeping 20cm separation distance and the prohibition of operating next to the person has been printed in the user' s manual
- Frequency Range** : 2.412 GHz ~ 2.462GHz
- Supported Channel** : 11 Channels
- Modulation Skill** : DBPSK, DQPSK, CCK
- Power Type** : By the power adaptor
Model: DSA-0151A-05A
I/P: 200-240VAC, 60Hz, 16W
O/P: 7.5VDC, 1A
Power cable 188cm length, non-shielded, no ferrite core

3. Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89/f	900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	100	30
1.34-30	824/f	2.19/f	180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

[The EUT is tested in transmit and receive modes and in the first, middle and the last channel separately. The following shows only our observation have the greatest emissions.]

According to OET BULLETIN 56 Fourth Edition/August 1999, Equation for Predicting RF Fields:

Früs Transmission Formula:
$$S = \frac{PG}{4pR^2} = \frac{127.058 \times 1.514}{4p(20)^2} = 0.0383 \text{ mW/cm}^2$$

Estimated safe separation:
$$R = \sqrt{\frac{PG}{4p}} = \sqrt{\frac{127.058 \times 1.514}{4p}} = 3.913 \text{ cm}$$

Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 3.913cm."

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

The Numeric gain G of antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain} / 10)$$

$$G = \text{Log}^{-1} (1.8 / 10) = 1.514$$



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TAI HWA ELECTRONIC CO., LTD.(CHINA)
SHANGHAI HUA YU ELECTRONIC CO., LTD.(CHINA)

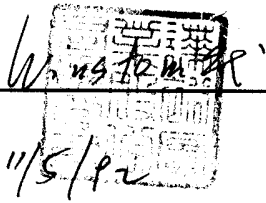
SPECIFICATION FOR APPROVAL

CUSTOMER: 友勁科技股份有限公司

PART NAME: 2.4G RF Antenna Assembly

PART NO: 11722B028A17*01 **REVISION:**

W. Y. P / NO.: C056-510122-A **REV.:** X2

	MANUFACTURER SIGNATURE	CUSTOMER SIGNATURE
APPROVED BY :		
DATE :	11/5/12	

WHA YU GROUP

WHA YU INDUSTRIAL CO., LTD. (HEAD OFFICE)

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SHANGHAI HUA YU ELECTRONIC CO., LTD. (CHINA)

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Pu Country Shanghai, China

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Fax: + 86-21-59741347

RF Antenna Cable Assembly

Specification

1. Electrical Properties :

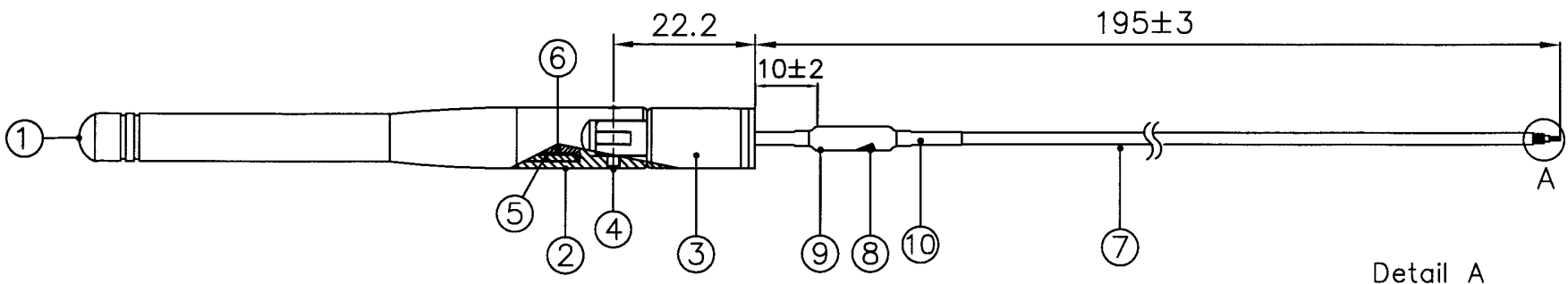
- 1.1 Frequency Rang..... 2.4GHz ~ 2.5GHz
- 1.2 Impedance 50 Ω Nominal
- 1.3 VSWR 1.92 Max.
- 1.4 Return Loss..... -10dB Maximum
- 1.5 Electrical Wave..... 1/2 λ Diople
- 1.6 Gain..... 1.8 dBi
- 1.7 Admitted Power..... 1W

2. Physical Properties :

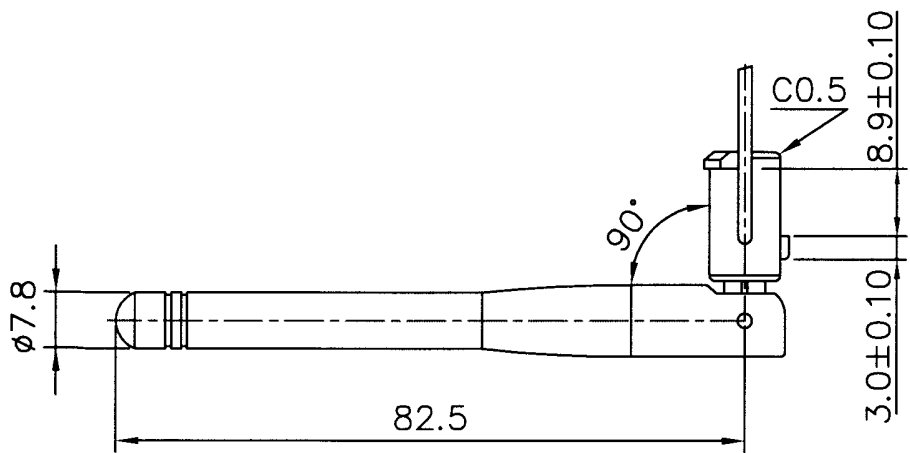
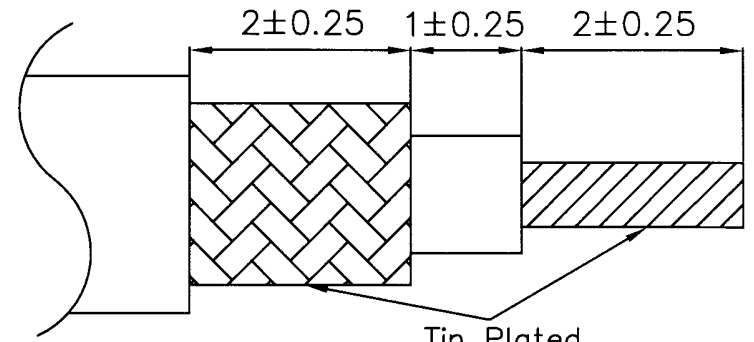
- 2.1 Cable..... RG-178 Cable
- 2.2 Antenna Cover..... TPE
- 2.3 Antenna Base..... PC
- 2.4 Operating Temp. -20 $^{\circ}$ C ~ +65 $^{\circ}$ C
- 2.5 Storage Temp. -30 $^{\circ}$ C ~ +75 $^{\circ}$ C
- 2.6 Color Black
- 2.7 Core..... RH 4*10*2

CG-

REV	DATE	DESCRIPTION
X1	10/27-2003	New Issue
X2	11/05-2003	Added PART NO.




Detail A



NO	DESCRIPTION	QTY	REMARK
10	Tube Heat Shrink Tube	2	
9	Tube Heat Shrink Tube	1	
8	Core RH 4*10*2	1	
7	Cable RG-178 ,50Ω ,Translucent Brown	1	
6	Insulator ABS Compound ,White	1	
5	Ground Tube Brass ,Ni Plated	1	
4	Rivet Brass , Cr Plated (Black)	2	
3	Antenna Base PC ; Color : Black	1	
2	Antenna Base PC ; Color : Black	1	
1	Antenna Body TPE ; Color : Black	1	

CUSTOMER'S SIGNATURE	XX ±5	APPROVED	CUSTOMER: 友勤科技股份有限公司 PART NO : 11722B028A17*01 PARTNAME: 24G RF Antenna Assembly W.Y.P/NO : C056-510122-A REV UNIT FILE : SSR-2783 X2 m/m SHEET : 1/1
	X ±3.0	Checked	
	X ±1.0	Checked	
	XX ±0.5	Checked	
	XXX ±0.1	DRAWING	
		Jane	



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Cable Specification

Cable : Mil-C-17 Coaxial Cable RG-178

1. Construction :

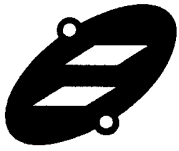
- 1 Conductor..... 30AWG 7/38 SCCS
- 2 Dielectric..... PTFE OD : 0.033"±0.002"
- 3 Shielded.....38AWG SPC OD : 0.051" Nominal
- 4 Jacket.....FEP OD : 0.071"±0.004"

2. Physical Properties :

- 1 Weight per 1000ft..... 6.3 lbs Maximum
- 2 Bend Radius.....0.35" Minimum
- 3 Operating Temperature Range -55°C~ 200°C

3. Electrical Properties:

- 1 Impedance..... 50±2 ohms
- 2 Capacitance..... 32 pF/ft Maximum
- 3 Cut off Frequency..... 116 GHz
- 4 Attenuation.....45.0 dB/100ft @ 1GHz
64.4 dB/100ft @ 2GHz
79.7 dB/100ft @ 3GHz
92.7 dB/100ft @ 4GHz
104.3 dB/100ft @ 5GHz
115.0 dB/100ft @ 6GHz



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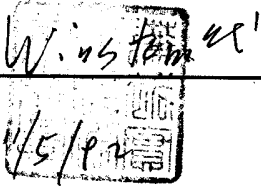
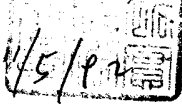
SPECIFICATION FOR APPROVAL

CUSTOMER: 友勁科技股份有限公司

PART NAME: 2.4G RF Antenna Assembly

PART NO: 11722B028A17*00 **REVISION:**

W. Y. P / NO.: C056-510123-A **REV.:** X2

	MANUFACTURER SIGNATURE	CUSTOMER SIGNATURE
APPROVED BY :		
DATE :		

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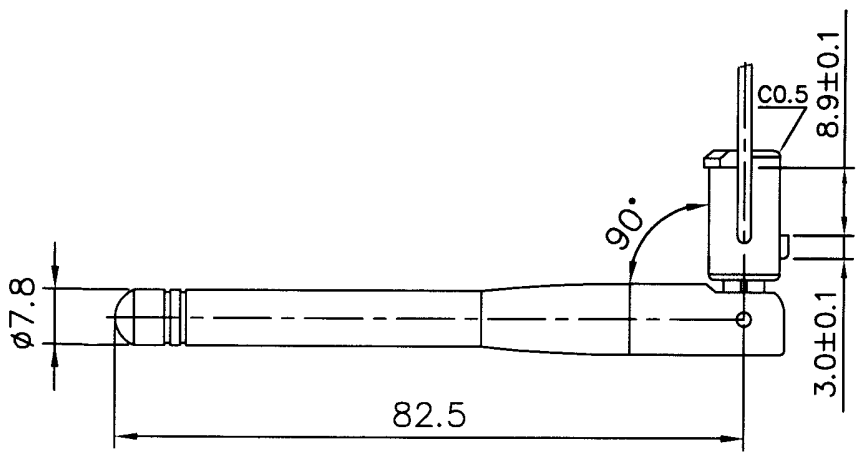
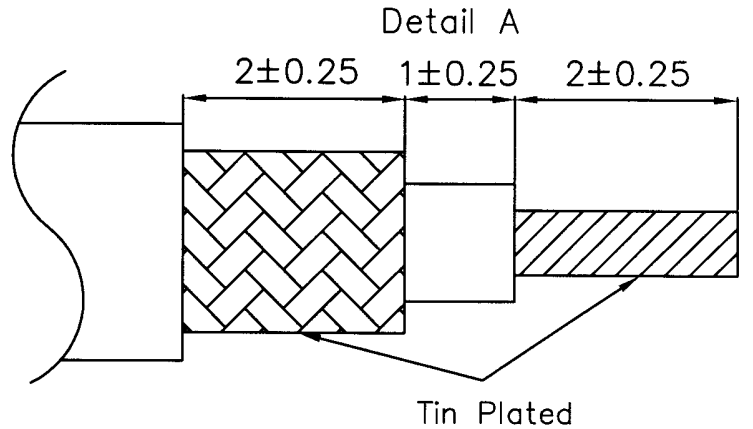
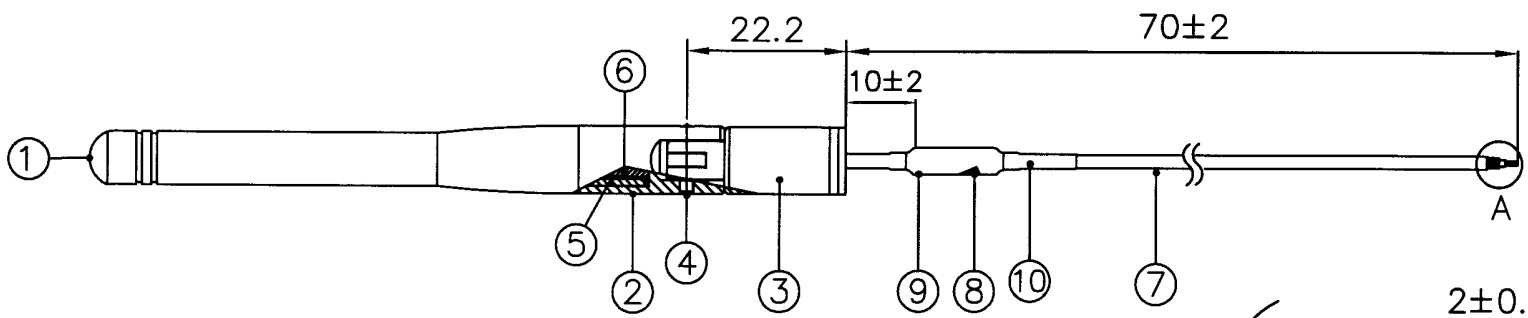
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- 2.6 Color Black
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REV	DATE	DESCRIPTION
X1	10/27-2003	Initial Sample Request
X2	11/05-2003	Added PART NO.



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5	Ground Tube	Brass ,Ni Plated	1	
4	Rivet	Brass , Cr Plated (Black)	2	
3	Antenna Base	PC ; Color : Black	1	
2	Antenna Base	PC ; Color : Black	1	
1	Antenna Body	TPE ; Color : Black	1	
NO	DESCRIPTION		QTY	REMARK

CUSTOMER'S SIGNATURE	XX	±5	APPROVED	CUSTOMER: 友勤科技股份有限公司 PARTNO : 11722B028A17*00 PARTNAME: 24GRF Antenna Assembly W.Y PNO : C056-510123-A REV UNIT FILE : SSR-2783 X2 m/m SHEET : 1/1
	X	±3.0	<i>Wings for 11/5</i>	
	X	±1.0	CHECKED	
	XX	±0.5	—	
	XXX	±0.1	DRAWING	
				<p style="text-align: center;">Wha Yu INDUSTRIAL CO.,LTD. 華裕實業股份有限公司</p> <p style="font-size: small;">THIS DRAWING, AND ITS INHERANT DESIGN CONCEPTS, ARE THE PROPERTY OF WHA YU AND AS SUCH MAY NOT BE COPIED, REPRODUCED, OR GIVEN TO THIRD PARTIES WITHOUT THE WRITTEN CONSENT OF WHA YU.</p>

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