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 Filed Strength (H) (A/m)	Power Density (S) (mW/cm2)	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:**

Friis Transmission Formula: $S = \frac{PG}{4\pi R^2} = \frac{127.058 \times 1.514}{4\pi (20)^2} = 0.0383 mW/cm^2$

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

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:

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

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

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

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 :	11/5/02	

WHA YU GROUP

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Fax: + 86-769-5599376

SHANGHAI HUA YU ELECTRONIC CO., LTD. (CHINA)
上海華裕電子有限公司
Address: Lian Ho Village, Bai Ho Town, Qing
Pu Country Shanghai, China
Tel: + 86-21-59741348 • + 86-21-59743624
Fax: + 86-21-59741347

RF Antenna Cable Assembly

Specification

1. Electrical Properties :

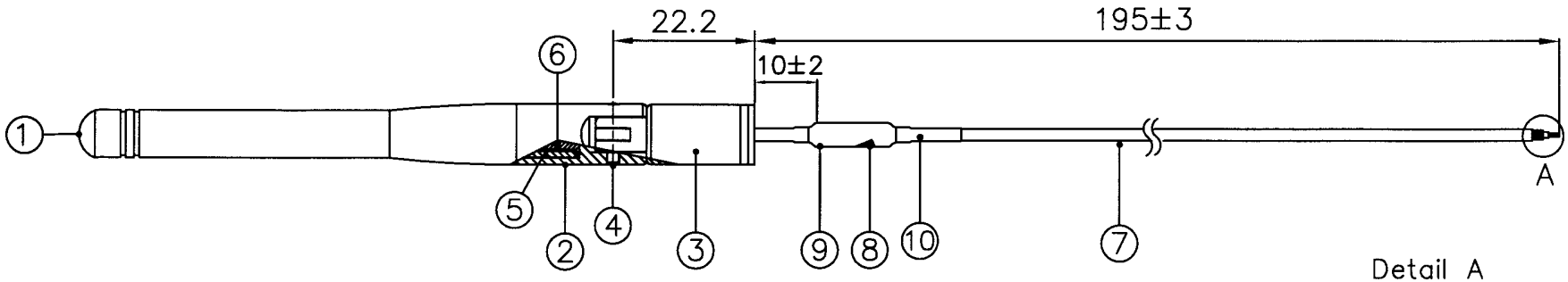
1.1 Frequency Rang..... 2.4GHz ~ 2.5GHz
1.2 Impedance ..... 50Ω Nominal
1.3 VSWR ..... 1.92 Max.
1.4 Return Loss..... -10dB Maximum
1.5 Electrical Wave..... 1/2 λ Diople
1.6 Gain..... 1.8 dBi
1.7 Admitted Power..... 1W

2. Physical Properties :

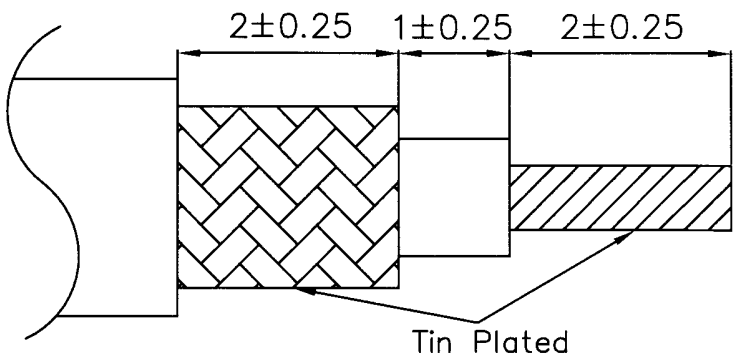
2.1 Cable..... RG-178 Cable
2.2 Antenna Cover..... TPE
2.3 Antenna Base..... PC
2.4 Operating Temp. .....-20℃ ~ +65℃
2.5 Storage Temp. .....-30℃ ~ +75℃
2.6 Color ..... Black
2.7 Core..... ..... RH 4*10*2

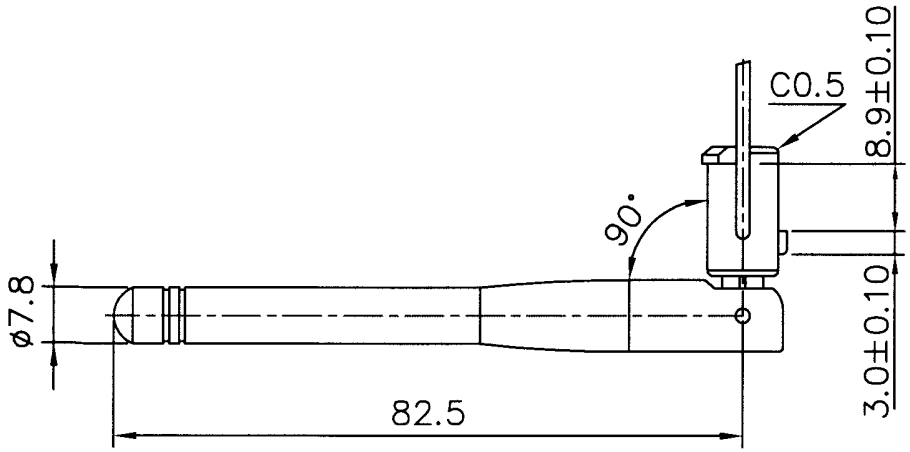
CG-

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 SINGATURE

XX.	±5
X.	±3.0
.X	±1.0
.XX	±0.5
.XXX	±0.1

APPROVED Winston 5/5

CHECKED

DRAWING Jane

CUSTOMER: 友勤科技股份有限公司

PART NO : 11722B028A17*01

PARTNAME: 2.4G RF Antenna Assembly

W.Y P/NO : C056-510122-A

REV	UNIT	FILE :	SSR-2783
X2	m/m	SHEET :	1/1

Wha Yu
INDUSTRIAL CO.,LTD.
譁裕實業股份有限公司

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 Properities :
   - 1 Weight per 1000ft..... 6.3 lbs Maximum
   - 2 Bend Radius.....0.35" Mininum
   - 3 Operating Temperature Range -55℃~200℃

3. Electrical Properities:
   - 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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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*00 *REVISION:*

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

	MANUFACTURER SIGNATURE	CUSTOMER SIGNATURE
APPROVED BY :		
DATE :	4/5/9	

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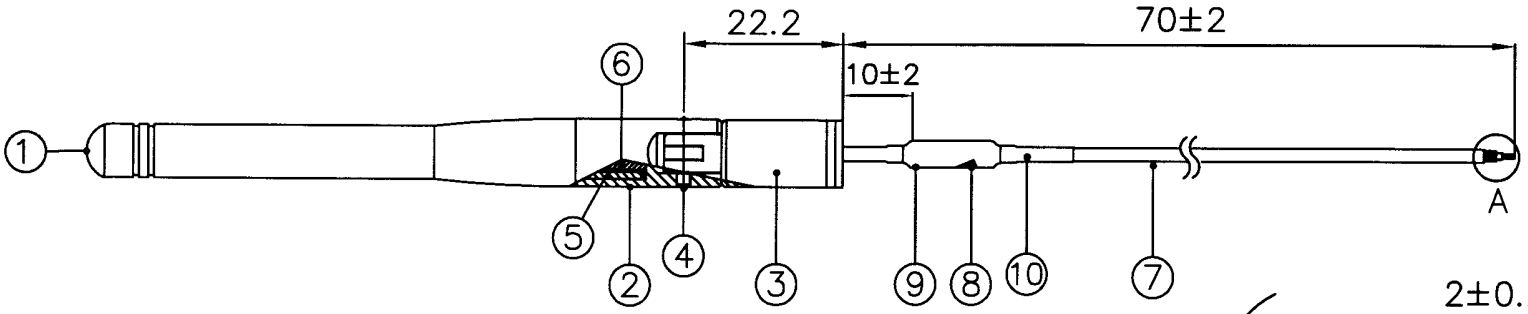
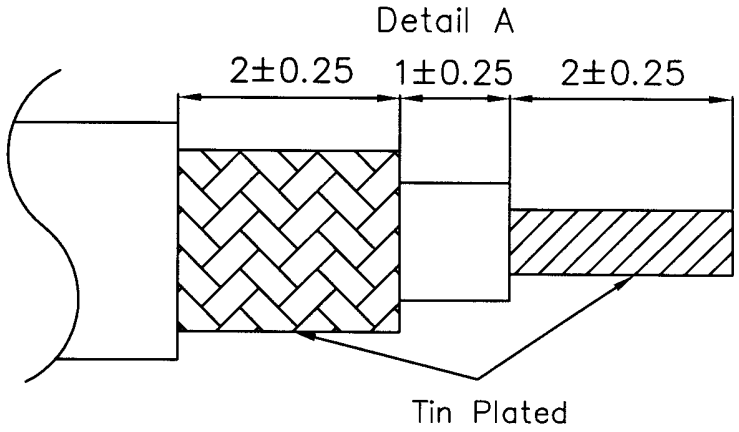
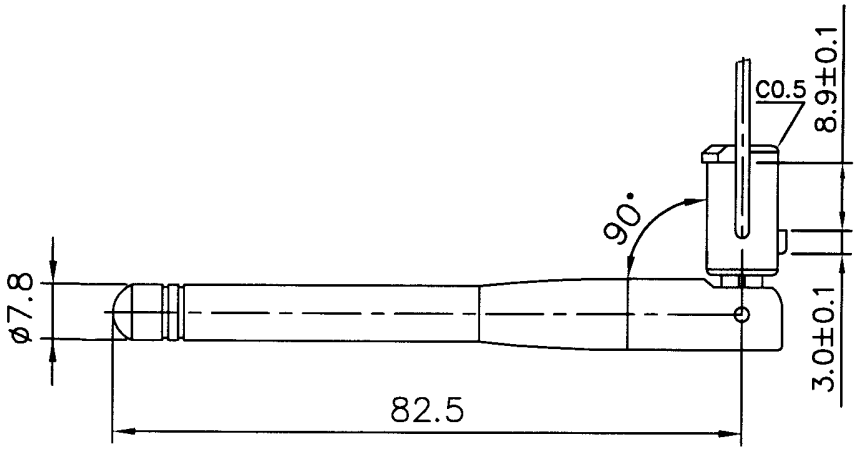
REV	DATE	DESCRIPTION
X1	10/27-2003	Initial Sample Request
X2	11/05-2003	Added PART NO.







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CUSTOMER'S SINGATURE

XX.	±5
X.	±3.0
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.XX	±0.5
.XXX	±0.1

APPROVED

CHECKED

DRAWING

CUSTOMER:	友勤科技股份有限公司		
PART NO :	11722B028A17*00		
PARTNAME:	2.4GRF Antenna Assembly		
W.Y P/NO :	C056-510123-A		
REV	UNIT	FILE :	SSR-2783
X2	m/m	SHEET :	1/1

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