

# 加利电子（无锡）有限公司

地址: 无锡高新技术产业开发区锡士路1号

电话: 86-510-88665500

传真: 86-510-88665511

## 零件承认书

### SPECIFICATION FOR APPROVAL

P/N of Galtronics


P/N of SerComm

021000073-3805A3

61721044GN

021000073-3805B3

TBD

<u>APPROVED BY</u>	<u>SIGNATURE</u>	<u>DATE</u>
Engineering Department Manager		2008.12.27
Mechanical Engineer	Robert	2008.12.24
RF Engineer	Nortee	2008.12.20
Customer Approval		

# 目 录

**1. Specification**

**2. Drawing**

**3. Field Plotting**

# ANTENNA SPECIFICATION

<u>REV NO.</u>	<u>DATE</u>	<u>DESCRIPTION</u>
S1	12-17-2008	Initial Draft
<b><u>DISTRIBUTION LIST:</u></b>		3.
1.		
2.		
<b><u>APPROVED BY</u></b>	<b><u>SIGNATURE</u></b>	<b><u>DATE</u></b>
Engineering Department Manager		
Mechanical Engineer Gary Wannagot		
RF Engineer Randy Cozzolino		
<b><u>Approved By Customer</u></b> (as required):		

**Preliminary Design Specification**

**2.4 GHz Compact Balanced Antennas**  
**For**  
**Linksys WAG120N Wireless Router**

**Galtronics P/N:**

**021000073-3805A3**

**021000073-3805B3**

**Sercomm P/N:**

**61721044GN**

**TBD**

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# ANTENNA SPECIFICATION

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## CONTENTS

1.0 PURPOSE AND SCOPE

2.0 RELATED DOCUMENTS

3.0 ABBREVIATIONS AND DEFINITIONS

4.0 DESCRIPTIONS AND PART NUMBER

4.1 Description

4.2 Part number

5.0 ELECTRICAL SPECIFICATIONS

5.1 Frequency Band

5.2 Impedance.

5.3 Matching Requirements

5.4 VSWR Requirements

5.4.1 Maximum VSWR

5.4.2 Test Method (Engineering)

5.4.3 Test Method (Production)

5.5 Efficiency (Measured in Free Space)

5.5.1 Minimum Values of Antenna Efficiency

5.5.2 Test Method

5.6 Peak and Average Gain

5.6.1 Minimum Peak and Average Gain Values

5.6.2 Peak Gain Limitation

5.6.3 Test Method

6.0 MECHANICAL SPECIFICATIONS

6.1 Mechanical Configuration

6.2 Cable Pull Test

7.0 ENVIRONMENTAL SPECIFICATIONS

7.1 Operating Temperature

7.2 Operating Humidity

7.3 Storage Temperature

7.4 Storage Humidity

8.0 QUALIFICATION

9.0 PACKAGING

# ANTENNA SPECIFICATION

## 1.0 PURPOSE AND SCOPE:

The purpose of this document is to establish a *design* specification for the antenna product that Galtronics is producing for Linksys. Any changes or additions to this specification can affect schedule and/or cost of the product and should be negotiated between Galtronics and Linksys before being incorporated into the specification. Upon agreement of this specification Galtronics will make no changes without written approval from Linksys. Any changes requested by Linksys will be given to Galtronics with sufficient time frame to evaluate the cost impact and react as required. The development of this product within Galtronics is conducted according to the Design Control Procedure SOP-006E.

## 2.0 RELATED DOCUMENTS:

SOP006E	Product Launch Procedure (Design Control)
EN006E	Reliability Guidelines
EIA-STD-556	Outer Shipping Container Bar Code Label Standard

## 3.0 ABBREVIATIONS AND DEFINITIONS

Ω	Ohm
°	Degree
°C	Celsius (degrees Centigrade)
cm	Centimetre
g	Grams
GHz	Gigahertz
Hz	Hertz
kg	Kilograms
MHz	Megahertz
M	Metre
mm	Millimetre
N	Newton
PCB	Printed Circuit Board
RH	Relative Humidity
W	Watt

Design Specification: A preliminary target specification to guide the design process.  
 Product Specification: A final specification for the qualified product.

## 4.0 DESCRIPTIONS AND PART NUMBER:

### 4.1 DESCRIPTION

These antennas are referred to as Galtronics' Compact Balanced Antenna. The patent-pending design consists of a single-piece high performance balanced antenna with coaxial cable. The cable is stripped and pre-tinned for soldering to device PCB. Two antennas are used per unit. The antennas have mounting features allowing for alignment and attachment to plastic enclosure. The antennas are held in place using heat-staking methods.

### 4.2 PART NUMBER

Galtronics P/N	Sercomm P/N	Frequency Band	Location in Wireless Router
021000073-3805A3	61721011GN	2.4 - 2.5 GHz	Left Rear
021000073-3805B3	TBD	2.4 - 2.5 GHz	Right Front

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# ANTENNA SPECIFICATION

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## **5.0 ELECTRICAL SPECIFICATIONS:**

### **5.1 FREQUENCY BAND**

Unlicensed ISM2400 Band: 2.4 – 2.5 GHz

### **5.2 IMPEDANCE - Nominal impedance: 50Ω**

### **5.3 MATCHING REQUIREMENTS.**

The compact balanced antennas do not require additional impedance matching circuitry.

### **5.4 VSWR REQUIREMENTS**

#### **5.4.1 VSWR Maximum**

Maximum VSWR allowed is 2.0:1

#### **5.4.2 TEST METHOD (ENGINEERING)**

The antennas are tested while mounted in the wireless router. The router is positioned in free space. (Free space means the device is placed on a non-conductive surface away from any conductive objects.)

#### **5.4.3 TEST METHOD (PRODUCTION)**

In mass production it is not practical to use the device supplied by customer. Galtronics will designate reference antennas that meet VSWR requirements when installed in the wireless router. The reference antennas will then be measured in free space on production test equipment. Production antennas will be measured on the same production test equipment, and are thereby correlated to the reference antennas.

### **5.5 EFFICIENCY**

#### **5.5.1 MINIMUM VALUES OF ANTENNA EFFICIENCY**

The efficiency of the antennas shall be a minimum of 50%.

#### **5.5.2 TEST METHOD**

The antennas are tested while mounted inside the wireless router. The router is then tested in an anechoic chamber in free space. The efficiency of each antenna is measured at a minimum of three frequency points across the band of interest. The antennas shall meet the minimum efficiency requirements.

# ANTENNA SPECIFICATION

## 5.6 MINIMUM PEAK AND AVERAGE GAIN

### 5.6.1 MINIMUM PEAK AND AVERAGE GAIN VALUES

<b>Azimuth Cut</b>				
<b>Right Front Antenna</b>			<b>Left Rear Antenna</b>	
<b>Frequency (GHz)</b>	<b>Power Sum Peak (dBi)</b>	<b>Power Sum Avg (dBi)</b>	<b>Power Sum Peak (dBi)</b>	<b>Power Sum Avg (dBi)</b>
2.40	3.00	-3.50	1.00	-1.50
2.45	3.00	-3.50	0.50	-1.50
2.50	3.00	-3.50	1.00	-1.50

<b>Elevation Cut (Front to Back)</b>				
<b>Right Front Antenna</b>			<b>Left Rear Antenna</b>	
<b>Frequency (GHz)</b>	<b>Power Sum Peak (dBi)</b>	<b>Power Sum Avg (dBi)</b>	<b>Power Sum Peak (dBi)</b>	<b>Power Sum Avg (dBi)</b>
2.40	-0.50	-3.50	-0.50	-3.00
2.45	0.00	-3.50	-0.50	-3.00
2.50	0.50	-3.00	0.00	-3.00

<b>Elevation Cut (Side to Side)</b>				
<b>Right Front Antenna</b>			<b>Left Rear Antenna</b>	
<b>Frequency (GHz)</b>	<b>Power Sum Peak (dBi)</b>	<b>Power Sum Avg (dBi)</b>	<b>Power Sum Peak (dBi)</b>	<b>Power Sum Avg (dBi)</b>
2.40	3.00	-1.00	0.00	-3.00
2.45	3.00	-1.00	0.50	-3.00
2.50	3.00	-1.00	0.50	-3.00

### 5.6.2 PEAK GAIN LIMITATION

According to FCC limitation, the peak gain of the antennas shall be limited to the following values:

	<b>Maximum Peak Gain</b>	<b>Typical Peak Gain (Reference)</b>
<b>Peak Gain Right Front Antenna</b>	Linksys to Define	4.2 dBi
<b>Peak Gain Left Rear Antenna</b>	Linksys to Define	2.0 dBi

### 5.6.3 TEST METHOD

The wireless router with antennas installed is mounted in an anechoic chamber in free space. The peak and average gain values are recorded for each antenna at the frequencies indicated. The antennas shall meet the minimum peak and average gain values.



## ANTENNA SPECIFICATION

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### **6.0 MECHANICAL SPECIFICATIONS**

#### **6.1 MECHANICAL CONFIGURATION**

The appearance of the antennas is in accordance with drawings 021000073-3805AX and 021000073-3805BX.

#### **6.2 CABLE PULL TEST**

The antenna cable and solder joint shall withstand a 3 N axial pull force. The antenna element is fixed in an appropriate fixture and a 3 N axial force is slowly applied. The force is maintained for 10 seconds. There shall be no permanent damage to the antenna after the test.

### **7.0 ENVIRONMENTAL SPECIFICATIONS**

#### **7.1 OPERATING TEMPERATURE**

Operating temperature range shall be 0° C to +100° C.

#### **7.2 OPERATING HUMIDITY**

Operating humidity range shall be 10% to 85%, non-condensing.

#### **7.3 STORAGE TEMPERATURE**

Storage temperature range shall be -20° C to +60° C.

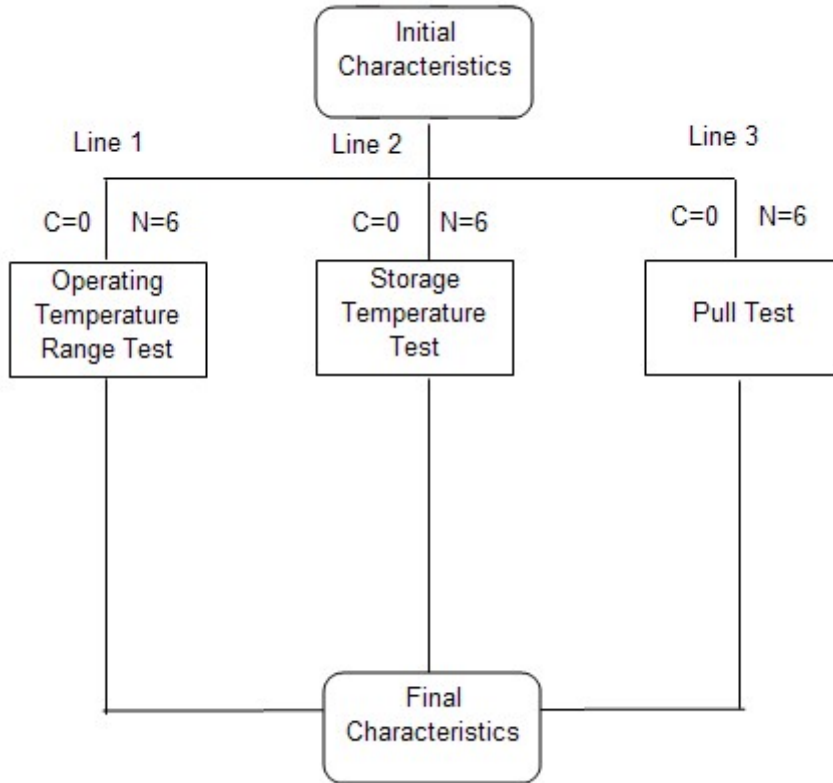
#### **7.4 STORAGE HUMIDITY**

Storage humidity range shall be 5% to 90%, non-condensing.

# ANTENNA SPECIFICATION

## 8.0 QUALIFICATION

The mechanical and environmental tests mentioned above are performed according to the flow chart shown in Figure 1 below. The entire testing procedure will be conducted according to EN006E.



**Figure 1. Property Verification Test Flow Chart**

Note: n - sample size; c - allowable amount of critical failures

## 9.0 PACKAGING

021000073-3805A3 will be packed by tray, 66 pcs antennas in one tray and 1320 pcs in one box.  
 021000073-3805B3 will be packed by tray, 70 pcs antennas in one tray and 1820 pcs in one box.

DWG No

**021000073-3805AX**

**GALTRONICS**

**DRAWING COVER SHEET**

REV	DATE	ECO #	DESCRIPTION
S6	30-11-07		Modify the strip dimensions. 1.2 was 2.5; 3 was 4; 6 was 7. Add label.
S7	03-12-07		21.5 was 19.5
S8	30-11-07		Modify the strip dimensions, 2.4 was 3; 5.4 was 6.
S9	28-01-08		20.1 +0.2/-0.5 WAS +/-0.5; ADDED COLOR GRAY TO COAX CABLE CALLOUT
S10	15-04-08		Add P/N 021000073-3805A7;
S11	28-04-08		Add P/N 021000073-3805A8; 6.00±0.5 was 6.00±0.2; 3.00±0.5 was 3.00±0.2; 1.20±0.5 was 1.2±0.2;
S12	17-12-08		Add Item "021000073-3805A9" And Parameter "B" In Table(A5)

**APPLICABLE SPEC'S:**

**INTERNAL DISTRIBUTION**

- PROCESS
- PURCHASING
- PRODUCTION
- PLASTICS
- QUALITY
- INCOMING INSPECTION
- FINAL INSPECTION
- MARKETING

SURFACE FINISH, MICROMETERS, CLA (UNLESS STATED) 0.8

TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 NO PLACE (X)? TWO PLACE (X.XX)?.  
 ONE PLACE (X.X)?.  
 THREE PLACE (X.XXX)?.

METRIC SCREW THREAD TO ISO STANDARDS 724, 286I, 965-1 AND 965-2 INCHES SCREW THREAD TO ANSI/ASME B1.1. ALL ANGLES TO BE 90° UNLESS OTHERWISE STATED. TOLERANCE ON ANGLES 1/4° ALL TOLERANCES APPLY AFTER FINISHING. MACHINE CORNER RADS. 0.25 MAX., TO BE FREE FROM BURRS, SHARP EDGES AND ALL FOREIGN MATERIALS. FLASH ALLOWANCE FOR PLASTIC MOLDED PARTS TO BE 0.1mm UNLESS OTHERWISE STATED. DIAMETER MUST BE CONCENTRIC WITHIN 0.08 T.I.R. ENVIRONMENTAL REQUIREMENTS: COMPLIANCE WITH GALTRONICS STANDARD "SUPPLIER ENVIRONMENTAL DECLARATION PROCEDURE" (SOPG002E).

**QUALITY ASSURANCE NOTES:**

NO CHANGE SHALL BE ALLOWED ON PRODUCTION. MATERIAL WITHOUT PRIOR EXPLICIT WRITTEN APPROVAL BY GALTRONICS ENGINEERING AND PURCHASING DEPARTMENTS FOR SPECIAL REQUIREMENTS SEE FMI49

**XR PROCESS CONTROL CHART REQUIRED WITH EACH SHIPMENT**

**CRITICAL DIMENSION AFFECTS FORM FIT OR FUNCTION**

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TITLE:

**MAIN ANTENNA**

CHKD:

APRVD:

DATE:

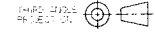
DWG. No.

**021000073-3805AX**

REV. **S12**

PAGE 1 OF 2

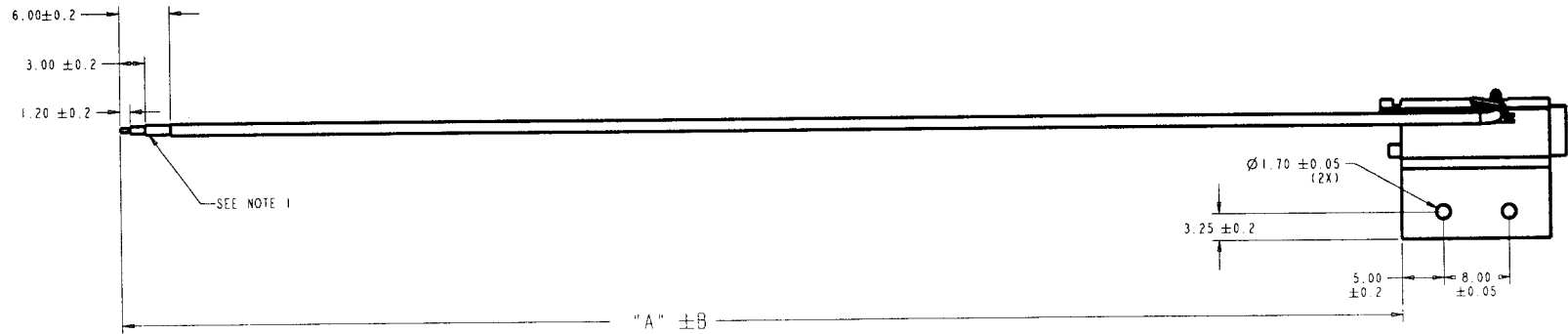
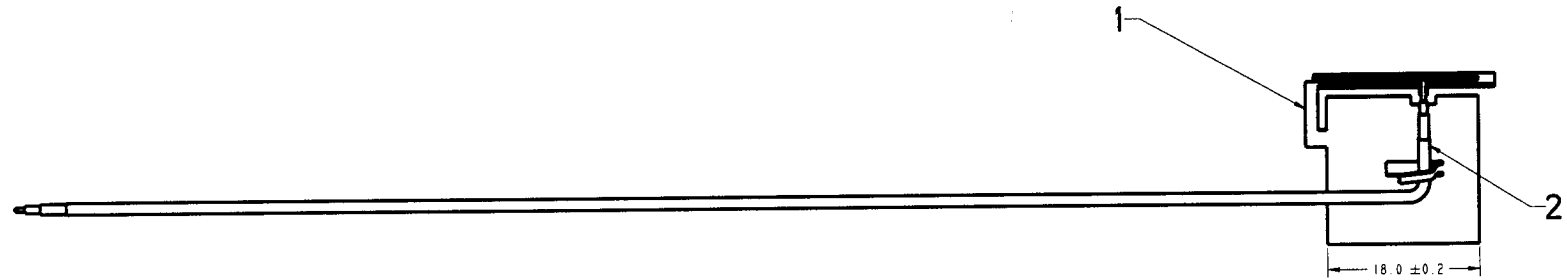
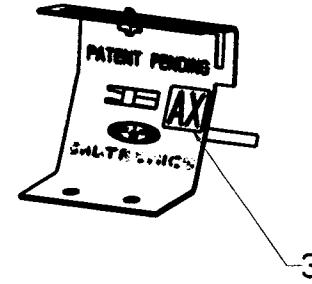
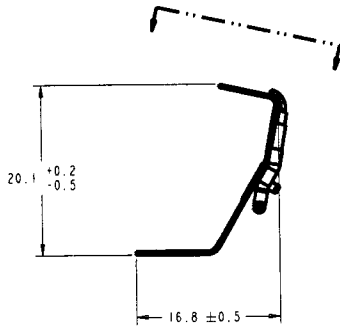
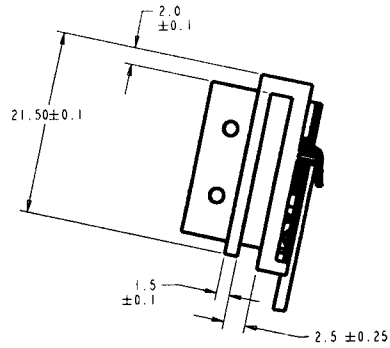
*28-12-11*



NOTES:

1. STRIPPED AND TINNED, USING LEAD FREE SOLDER. BARE END OF COAX CABLE.

PART NUMBER	"A" DIMENSION	"B" TOLERANCE
021000073-3805A1	164	4
021000073-3805A2	193	4
021000073-3805A3	120	4
021000073-3805A4	75	4
021000073-3805A7	225	4
021000073-3805A8	248	4
021000073-3805A9	55	3



NO	DESCRIPTION	MATERIAL	FINISH
3	Label		
2	CABLE, COAX	Ø 1.37 O.D., COLOR GRAY	
1	ELECTRICAL ELEMENT	STAINLESS STEEL SS304 THICKNESS 0.4 mm	NICKEL PLATING



ENGINEER  
DRAWN  
DATE

CHECKED  
APPROVED  
DATE

*Robert*  
*12-17*  
*12-17*  
ANTENNA, MAIN

DWG No

**021000073-3805BX**

**GALTRONICS**

**DRAWING COVER SHEET**

REV	DATE	ECO #	DESCRIPTION
S4	07-11-07		P/N WAS 021006073NC3805-1; ADDED P/N TABULATION TABLE; "A" DIMENSION WAS 171.
S5	13-11-07		ADDED DIMENSIONS AND TOLERANCES.
S6	30-11-07		Modify the strip dimensions. 1.2 was 2.5; 3 was 4; 6 was 7.
S7	28-01-08		ADDED COLOR GRAY TO COAX CABLE CALLOUT.
S8	17-12-08		Add Item "021000073-3805B2", "021000073-3805B3" And Parameter "B" In Table(A5)

**APPLICABLE SPEC'S:**

**INTERNAL DISTRIBUTION**

- PROCESS
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- QUALITY
- INCOMING INSPECTION
- FINAL INSPECTION
- MARKETING

SURFACE FINISH, MICROMETERS, CLA (UNLESS STATED) 0.8

TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 NO PLACE (X)? TWO PLACE (X.XX)?.1  
 ONE PLACE (X.X)?.2 THREE PLACE (X.XXX)?.05

METRIC SCREW THREAD TO ISO STANDARDS 724, 2861, 965-1 AND 965-2 INCHES SCREW THREAD TO ANSI/ASME B1.1. ALL ANGLES TO BE 90° UNLESS OTHERWISE STATED. TOLERANCE ON ANGLES 1/4° ALL TOLERANCES APPLY AFTER FINISHING. MACHINE CORNER RADS, 0.25 MAX., TO BE FREE FROM BURRS, SHARP EDGES AND ALL FOREIGN MATERIALS. FLASH ALLOWANCE FOR PLASTIC MOLDED PARTS TO BE 0.1mm UNLESS OTHERWISE STATED. DIAMETER MUST BE CONCENTRIC WITHIN 0.08 T.I.R. ENVIRONMENTAL REQUIREMENTS: COMPLIANCE WITH GALTRONICS STANDARD "SUPPLIER ENVIRONMENTAL DECLARATION PROCEDURE" (SOPG002E).

**QUALITY ASSURANCE NOTES:**

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- XR PROCESS CONTROL CHART REQUIRED WITH EACH SHIPMENT
- CRITICAL DIMENSION AFFECTS FORM FIT OR FUNCTION

MATERIAL  
FINISH

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TITLE:

**THIRD ANTENNA**

CHKD: *mark 28-11-07*

APRVD: *[Signature]*

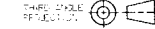
DATE: *2008-12-17*

DWG. No.

**021000073-3805BX**

REV. **S8**

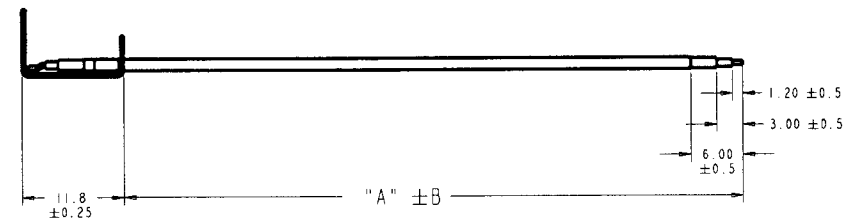
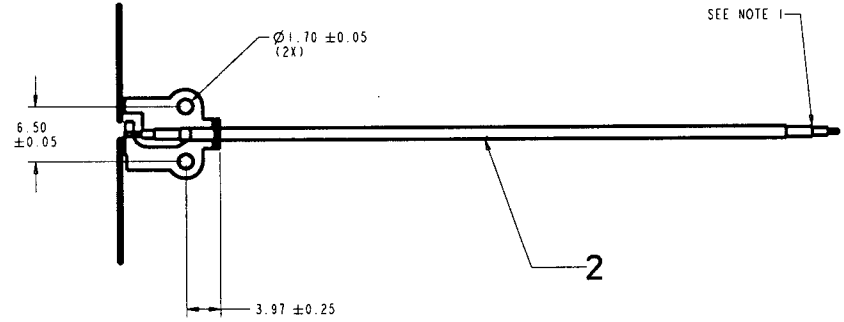
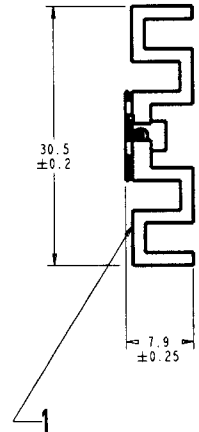
PAGE 1 OF 2



NOTES:

1. STRIPPED AND TINNED, USING LEAD FREE SOLDER, BARE END OF COAX CABLE.

PART NUMBER	"A" DIMENSION	B TOLERANCE
021000073-3805B1	43	3
021000073-3805B2	188	4
021000073-3805B3	120	4



NO	DESCRIPTION	MATERIAL	FINISH
2	CABLE, COAX	Ø 1.37 O.D., COLOR GRAY	
1	ELECTRICAL ELEMENT	STAINLESS STEEL SS304 THICKNESS 0.4 mm	NICKEL PLATING

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ENGINEER	Robert	CHECKED	<i>mark</i>
DRAWN		APPROVED	<i>Robert</i>
DATE		DATE	

ANTENNA, THIRD  
 2-8-12