SPECIFICATION

SPEC NO. :

PART NO. : **SPK-GPS-CMA-31B**

PRODUCT NAME : **GPS Antenna module**

DESCRIPTION : **With Low Noise Amplifier**

S.P.K. ELECTRONICS CO., LTD.

SPECIFICATION FOR GPS ANTENNA WITH LOW NOISE AMPLIFIER

1.0 CONFIGURATION

1.1	RF Cable	RG174 , ϕ 2.7 ± 0.1mm , Black	
		Cable Length	(optional) m ± 5cm
1.2	RF Connector	Connector : Optional	

2.0 SYSTEM

This antenna system consists of two functional blocks, the LNA portion and the patch antenna.

3.0 GENERAL

3.1 ENVIRONMENTAL CONDITIONS

3.1.1	Operation Temperature	-30℃ to + 80℃
3.1.2	Storage Temperatur	-40℃ to + 100℃
3.1.3	Relative Humidity	40% to 95%

3.2 ELECTRICAL SPECIFICATIONS

3.2.1	Input Voltage	Min:2.5V Max:5.5V	
3.2.2	Power Consumption	At 3.0 V	Typ: 13mA. Max: 16mA.
		At 5.0 V	Typ: 18mA. Max: 22mA.

3.3 MECHANICAL SPECIFICATIONS

3.3.1	Mounting	Magnet mount.
3.3.2	Horizontal Pulling Force of Magnet	1.5 Kg Min.
3.3.3	Water Proof	Deep into water 50cm, 30 Min.
3.3.4	Shock	10msec. Half sine wave.
3.3.5	Vibration	10~200Hz Log. Sweep 3.0G sweep time: 15 Minutes, 3 Axes.
3.3.6	Magnet Threshold	The antenna must stay atlached to the vehicle, at a speed of 180 km/h.
3.3.7	Cable Pulling Off Force	At room temperature Min 7Kg /10sec. Apply 7Kg /10sec pulling force between the cable and the antenna unit,no visible damage shall appear on the cable and connector.
3.3.8	Bending Test	After bending 90° right and left for 1,000 cycles, no permanent damage were found.
3.3.9	Weight	105g Max.
3.3.10	Dimension	See Fig. 2

4.0 ANTENNA

4.1	Frequency Range	1575.42 ± 1.023 MHz.
4.2	Gain	90° : 2.0 dBi Min. 20° : -5.0 dBi Min. Mounted on the 60mm*60mm ground plane.
4.3	Polarization	RHCP
4.4	Axial Ratio	90° : Max 3.0dB Mounted on the 60mm*60mm ground plane.

5.0 LNA

5.1	Frequency Range	1575.42 ± 1.023 MHz
5.2	Gain	28 ± 4.5dB (+ 25 ℃± 5℃)
5.3	Noise Figure	1.5 dB Max. (+25 ℃ ± 5℃) 2.2 dB Max. (+85 ℃)
5.4	Out Band Rejection	fo = 1575.42MHz fo ± 20 MHz 7dB MIN fo ± 30 MHz 12dB MIN fo ± 50 MHz 20dB MIN fo ± 100 MHz 30dB MIN
5.5	Output Impedance	50Ω
5.6	Output VSWR	2.0 Max

6.0 TOTAL SPECIFICATIONS (Through Antenna, LNA, Cable and Connector)

6.1	Frequency Range	1575.42 ± 1.023MHz
6.2	Gain	At 90° 30 ± 4.5dBi – (cable loss) Note:1
		mounted on the the 60mm*60m ground plane
6.3	Output Impedance	50Ω
6.4	VSWR	2.0 Max

Note 1: Cable Loss = Max.(–1.2dB / m)

7.0 BLOCK DIAGRAM

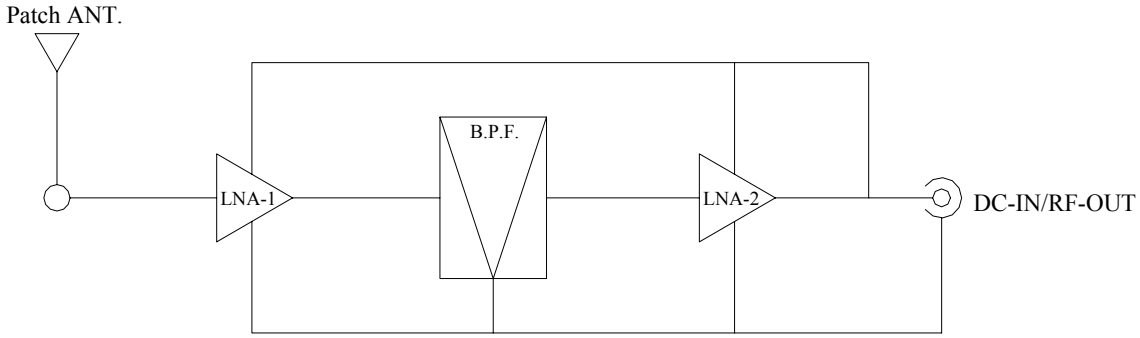


Fig.1

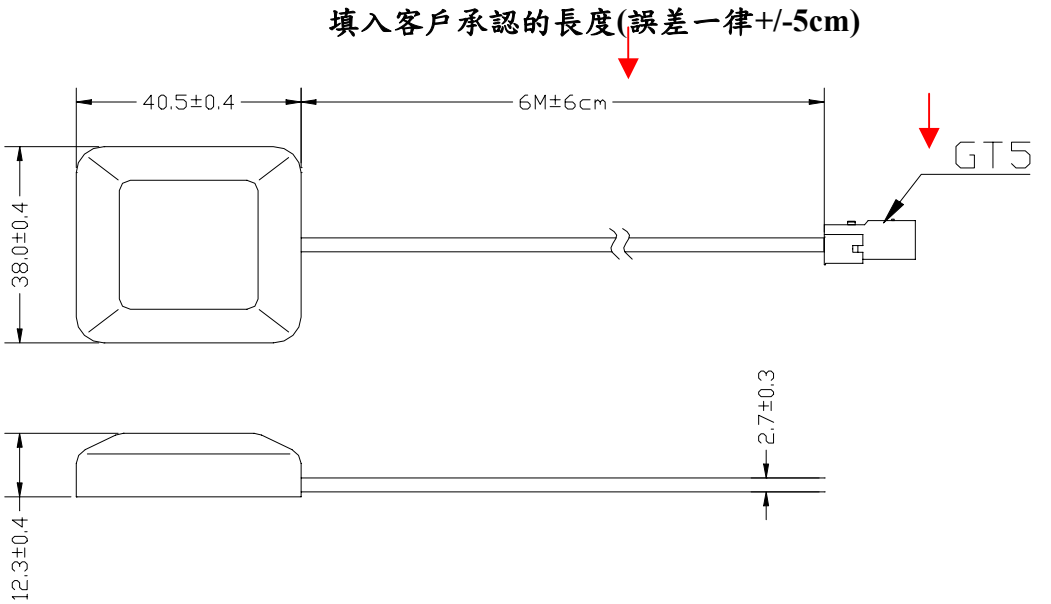
8.0 CAUTIONS

GPS (Global Positioning System) is a satellite-based navigation system. In an unobstructed clear view of the sky, GPS works anywhere in the world, 24 hours a day.

GPS is developed and operated by the government of United States. Under the policy of the government, the degradation in accuracy shall occur without prior warnings, and sometimes satellites don't transmit signal due to adjustment, test, and orbital revision.
Also, please note:

1. products such as motors, computer, and RF devices, which emmit high levels of magnetic field and interference, that may cause the performance of the GPS unit to drop.
2. the optimal position during automobile applications is on the roof top of the vehicles. If the GPS antenna unit is to be placed inside the car, be certain to avoid coverage by metal objects for optimal performance.

9.0 OUTLINE



Unit:mm

Fig. 2

10.0 ANTENNA PATTERN

10.1 H-Plan

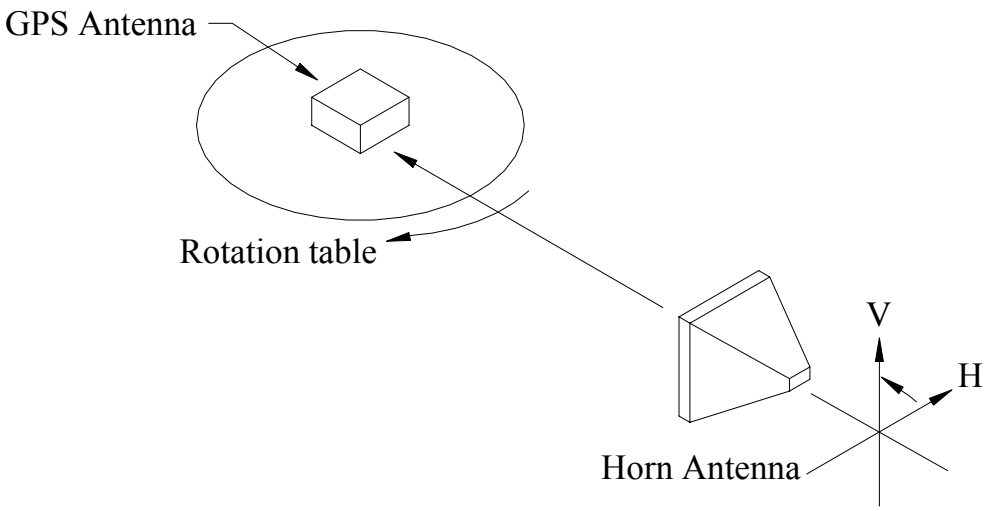
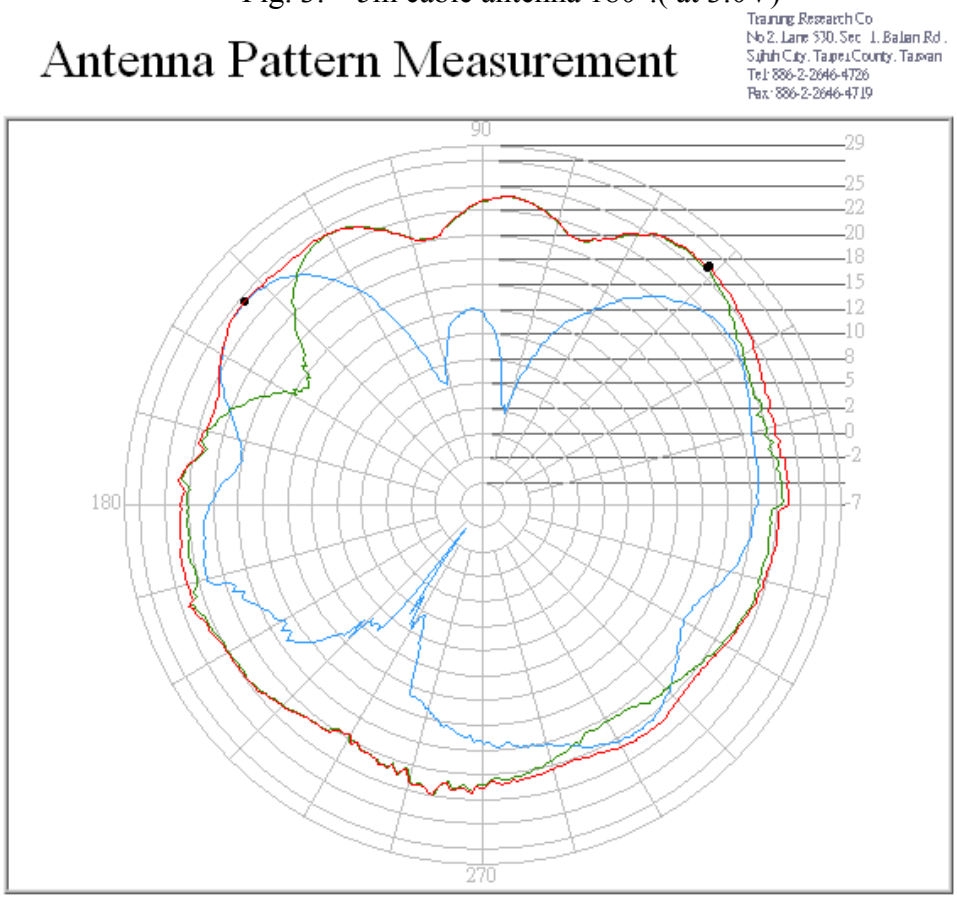


Fig. 3. 5m cable antenna 180°.(at 3.0V)



Model No.	Test Mode	Freq(MHz)	Source Polarization	Peak Gain(dBi)	Avg. Gain(dBi)	Peak Angle	Date
GA31 GND	01	1575	Horizontal	24.38	19.13	139.52	2004/6/10
GA31 GND	01	1575	Vertical	25.82	22.00	46.40	2004/6/10
GA31 GND	01	1575	H+V	26.05	22.80	46.51	2004/6/10

10.2 E –plan

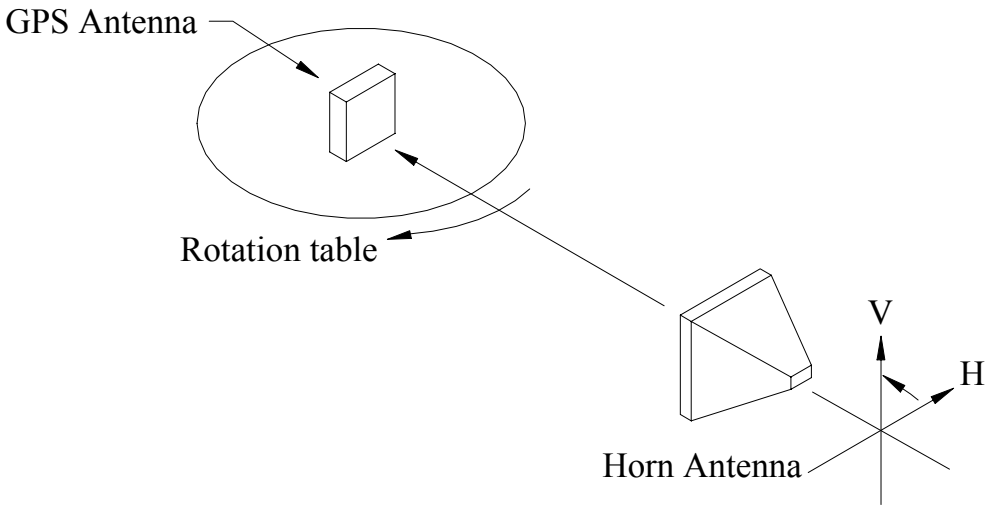
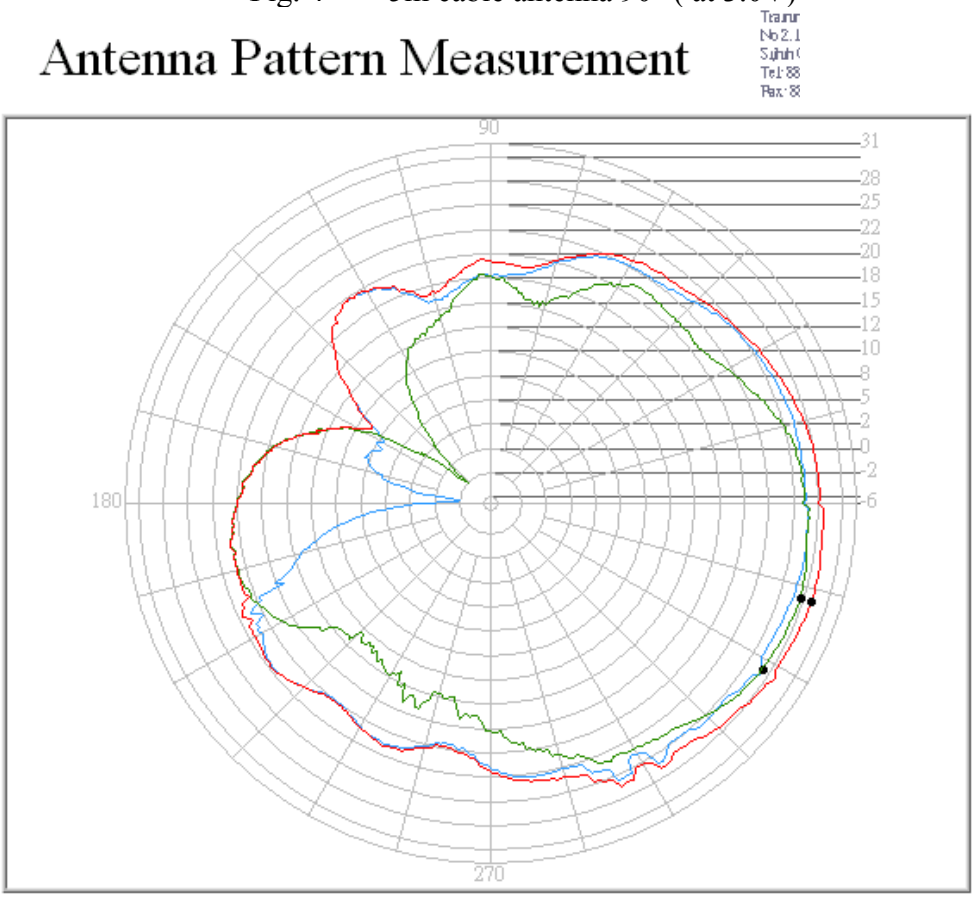


Fig. 4 5m cable antenna 90° (at 3.0V)



Model No.	Test Mode	Freq(MHz)	Source Polarization	Peak Gain(dBi)	Avg. Gain(dBi)	Peak Angle	Date
GA31 GND	02	1575	Horizontal	26.90	22.57	328.13	2004/6/10
GA31 GND	02	1575	Vertical	27.21	21.56	342.82	2004/6/10
GA31 GND	02	1575	H+V	28.37	23.78	342.78	2004/6/10

11.0 Package

11.1 100 Units / Carton (Fig. 5)

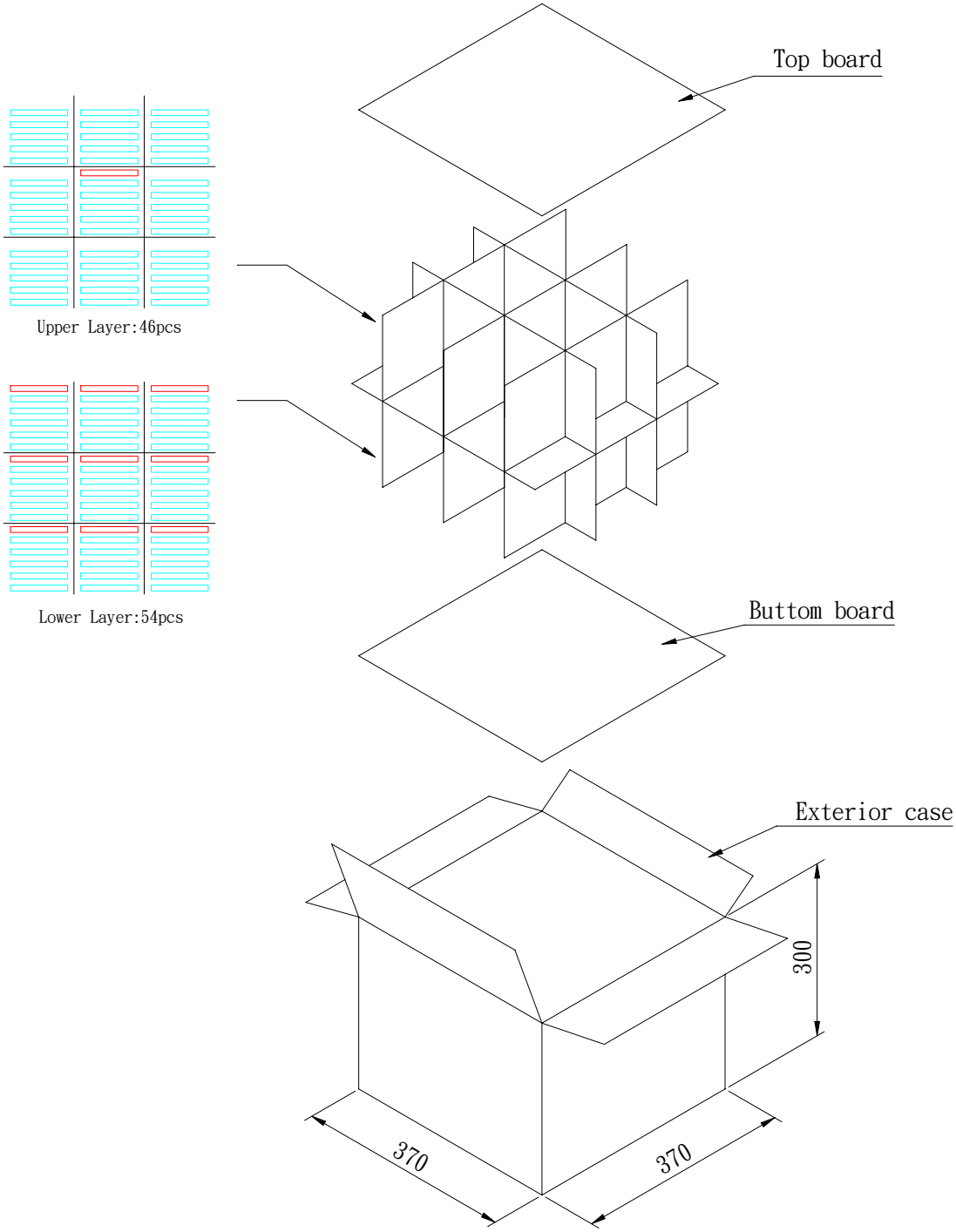


Fig. 5

12.0 Order Information

12.1 Part Number

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
0	3	0	0	1	3	X	X	3	X	A	0	X	0	0
						Cable Length			Connector Type			Serial Number		

12.2 (7,8 digit) Cable Length:

NO.	00	04	06	09	15
Length	5M	3M	1M	2M	6M

12.3 (10 digit) Connector Type:

NO.	0	1	2	3	4	6	7	8	A	B	C	D
TYPE	No	GT5 (F)	BNC (M)	SMA (M)	MCX (M)	SMB (F)	UFL	MCX90° (M)	MMCX180° (M)	MMCX90° (M)	MMCX180° (F)	SMB PLUG-C