

# DATA SHEET

## 2.45/5GHz P2 Multi Band Antenna with Cable & Connector for IEEE802.11b, 11g, 11a & UNII

Product specification: Version X04 (A00)

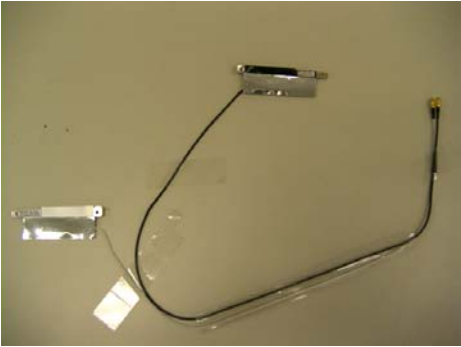
Jul 24, 2003

2.45/5GHz P2 Multi Band Antenna with Cable & Connector for IEEE802.11b, 11g, 11a, UNII				CAN4313 351 012501B				—	X04	Jul 24, 03	
				CAN4313 351 022501B				—	2		
				CAN4313 351 032501B				▶	3		
				CAN4313 351 042501B				▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	1	SH nr.	▶	4	
CHECK				DATE / 日期	Jul. 24, 2003			▶	5		

**P2 Multi Band Antenna  
FOR WLAN IEEE 802.11b/11g/11a, UNII  
(With Cable & Mini PCI Connector)**

**Product Specification**

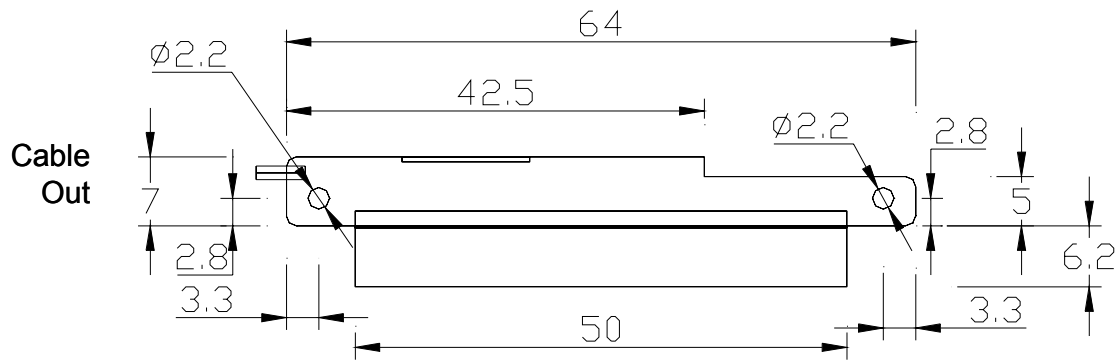
**QUICK REFERENCE DATA**

Antenna Patch Dimension	64*7*0.5 mm Main Antenna 64*7*0.5 mm Aux Antenna	
Main LCD Cable Length	350 mm, Color White (CAN4313351012501B)	
Main Base Cable Length	180 mm, Color White (CAN4313351022501B)	
Aux LCD Cable Length	450 mm, Color Black (CAN4313351032501B)	
Aux Base Cable Length	200 mm, Color Black (CAN4313351042501B)	
MMCX Connector	Molex/Aliner or Compatible	
MiniPCI Connector	Ipex/Hirose or Compatible	
Peak Gain	2.9 dBi/2.45GHz Band 3.1 dBi/5GHz Band	
VSWR	2.0 for 2.45GHz band 2.5 for 5GHz band	
Polarization	Linear	
Impedance	50Ω	
Operating Temperature	-40~90 °C	
Maximum Power	1W	
Supplier Address	Yageo/Phycomp (Taiwan) Ltd. 16, west 3rd Street, N.E.P.Z. Kaohsiung, 811 Taiwan, R.O.C. Yegeo/Phycomp Electronics (China) Co, Ltd. No. 10, Zhu Yuan Road, Suzhou New District, Suzhou, PRC	

<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b>			—	X04	Jul 24, 03	
				<b>CAN4313 351 022501B</b>			—	2		
				<b>CAN4313 351 032501B</b>			▶	3		
				<b>CAN4313 351 042501B</b>			▶			
BY / 製定者	Cliff/Howard	SUPER / 原圖編號	TLL.SH / 共頁	13	PAGE/ 頁	2	SH nr.	— ▶	4	
CHECK				DATE / 日期	Jul. 24, 2003		— ▶	5		

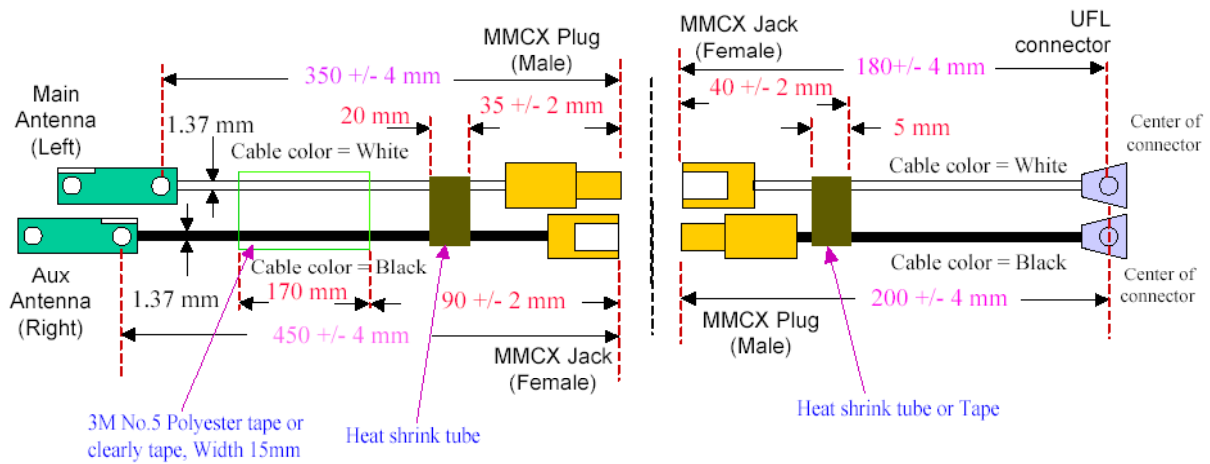
**DIMENSIONAL DATA and Connector/Cable Information (Tolerance:± 0.25 mm)**

**- Antenna Body (Main and Aux, Copper Metal Material):**



**Antenna cable length and MMCX Connectors for P2 Project**

LCD side ← → System base side

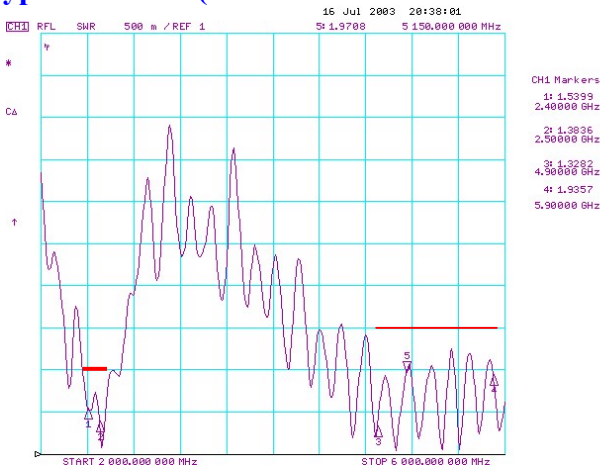


Note: The coaxial cable will be a 1.37mm diameter cable, double shielded, cable. It's inner conductor of the cable is silver-coated annealed copper wire or plated tin-copper alloy, the dielectric is a flouro-plastic (FEP) with a nominal diameter of 0.66mm and a nominal thickness of 0.21mm, the outer conductor is silver plated annealed copper wire with a nominal diameter of 0.89/ 1.12mm, and the jacket is a flouro-plastic (FEP) with an outer diameter of 1.37mm with a nominal thickness of 0.1mm. The cable has a characteristic impedance of 50ohm, an insulation resistance of 1500meg-ohm/km maximum, and no breakdown for a dielectric withstanding voltage of 2000VAC for 1 minute. The insertion loss of a 250mm long cable assembled on both ends shall be no more than 0.85dB at 2.45GHz and no more than -1.5dB at 6.0GHz.

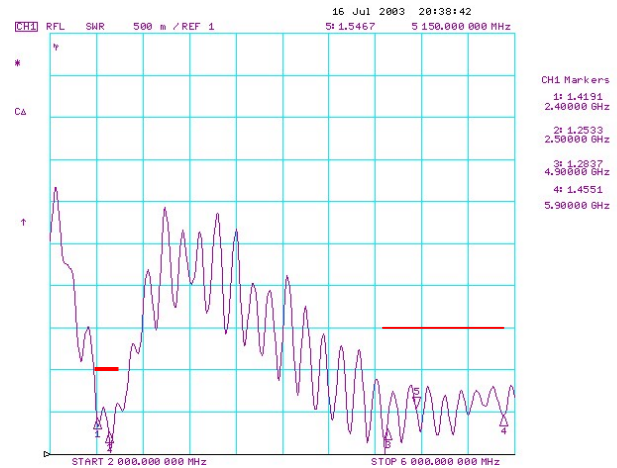
Note: MMCX connector is made of Brass and gold plated with Teflon insulator. Maximum matching force is 3.4 lbs and un-mating force is 1.0~3.0 lbs. Dielectric withstanding voltage 500 Vrms, Insulation Resistance 1000M Ohm. Typical VSWR 1.12 @ 6GHz. Moisture Resistance follows MIL-STD-202, method 106 with 200Mohm.

<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b>				—	X04	Jul 24, 03	
				<b>CAN4313 351 022501B</b>				—	2		
				<b>CAN4313 351 032501B</b>				▶	3		
				<b>CAN4313 351 042501B</b>				▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	3	SH nr.	▶	4	
CHECK				DATE / 日期		Jul. 24, 2003		▶	5		

### Typical VSWR (After Installation in Notebook)



**Main Antenna**

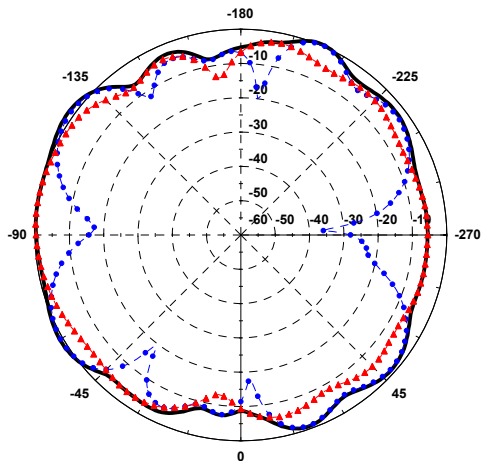


**Aux Antenna**

Note: May vary for different devices

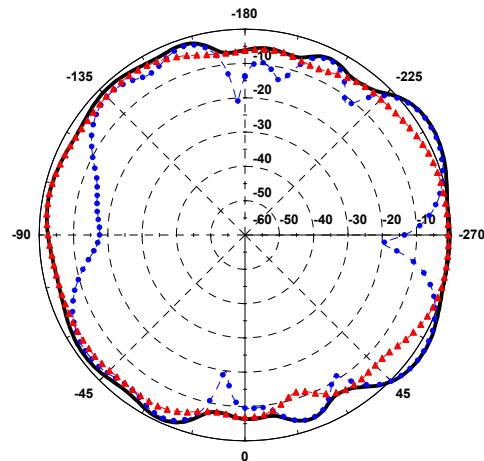
### Typical Radiation Pattern Polar Plot (Based on After Antenna Installation)

- Main



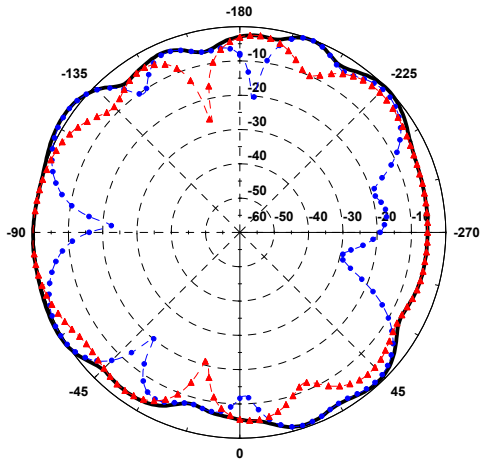
2400 MHz (Max Gain: 2.9dBi)

-Aux Antenna

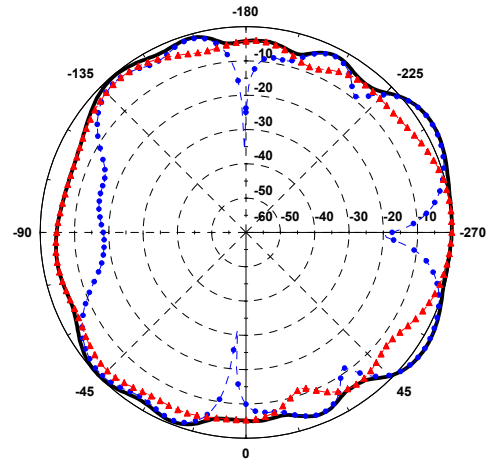


2400 MHz (Max Gain: 1.7dBi)

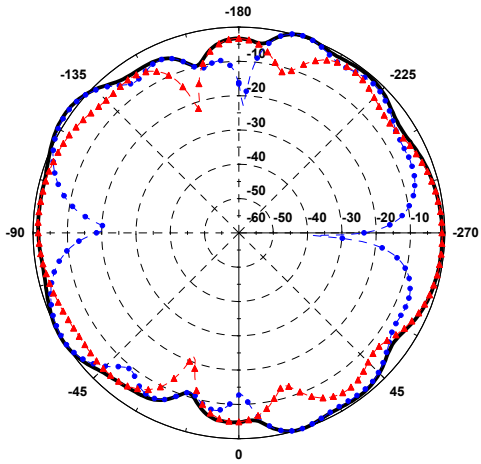
<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b> <b>CAN4313 351 022501B</b> <b>CAN4313 351 032501B</b> <b>CAN4313 351 042501B</b>			—	X04	Jul 24, 03		
							—	2			
							▶	3			
							▶	4			
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	4	SH nr.	▶	4	
CHECK				DATE / 日期		Jul. 24, 2003		▶	5		



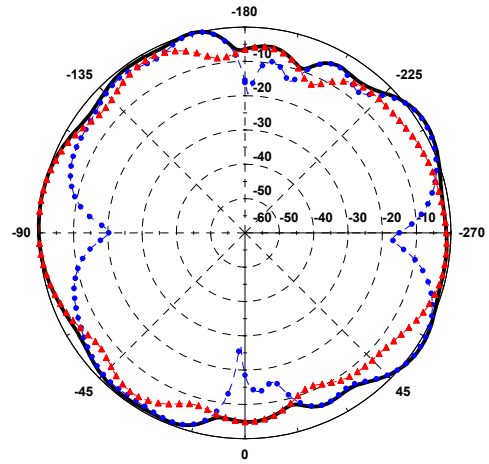
2450 MHz (Max Gain: 2.9dBi)



2450 MHz (Max Gain: 1.6dBi)

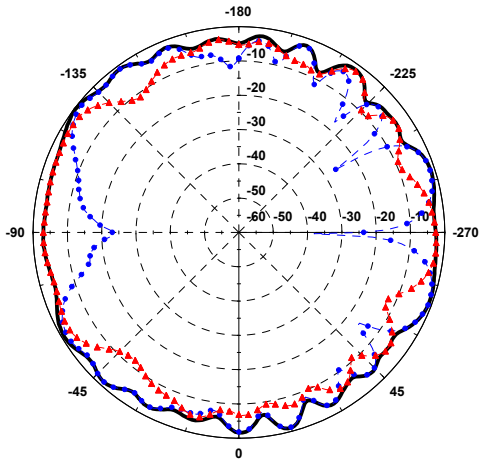


2500 MHz (Max Gain: 1.6dBi)

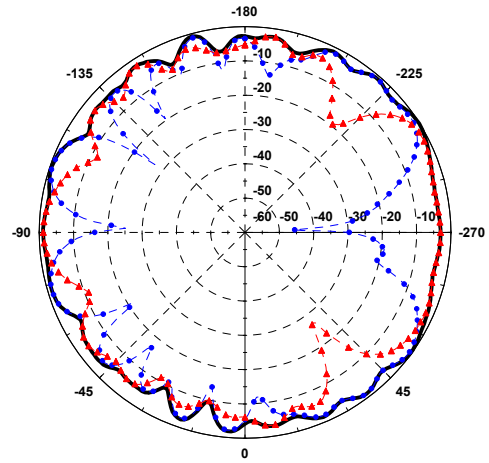


2500 MHz (Max Gain: 1.4dBi)

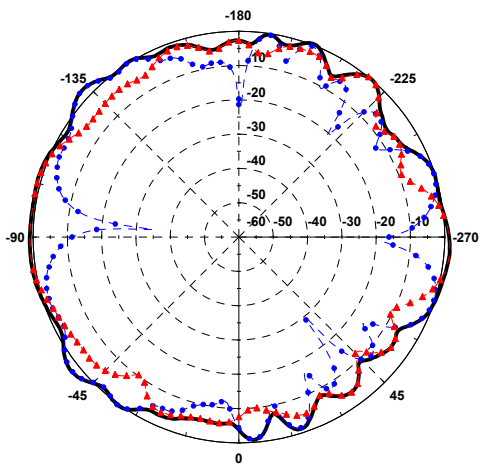
<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b>			—	X04	Jul 24, 03	
				<b>CAN4313 351 022501B</b>			—	2		
				<b>CAN4313 351 032501B</b>			▶	3		
				<b>CAN4313 351 042501B</b>			▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號	TLL.SH / 共頁	13	PAGE/ 頁	5	SH nr.	▶	4	
CHECK			DATE / 日期	Jul. 24, 2003				▶	5	



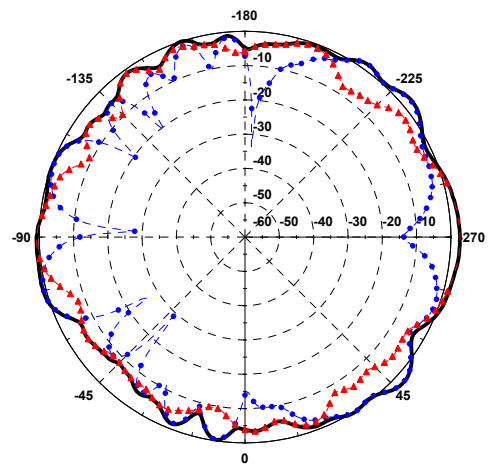
4900 MHz (Max Gain: -0.3dBi)



4900 MHz (Max Gain: -0.1dBi)

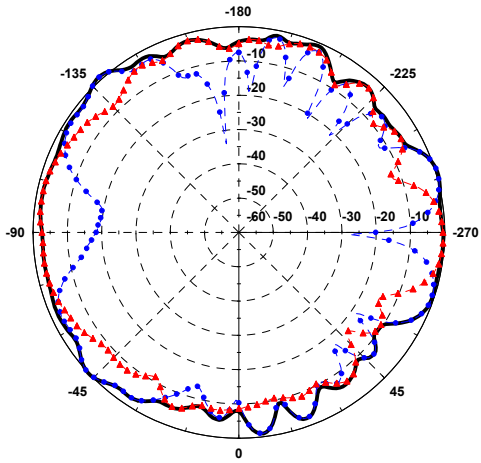


5150 MHz (Max Gain: 2.6dBi)

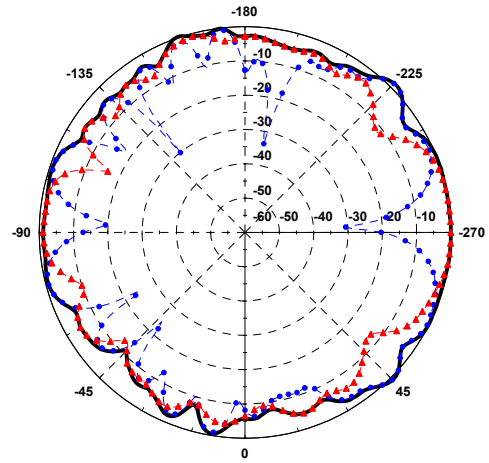


5150 MHz (Max Gain: 2.8dBi)

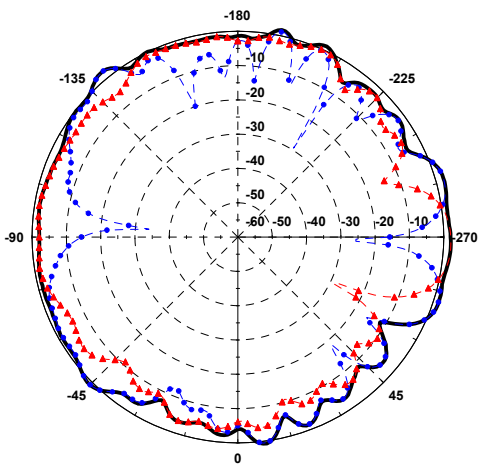
<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b> <b>CAN4313 351 022501B</b> <b>CAN4313 351 032501B</b> <b>CAN4313 351 042501B</b>			—	X04	Jul 24, 03		
							—	2			
							▶	3			
							▶	4			
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	6	SH nr.	▶	4	
CHECK				DATE / 日期	Jul. 24, 2003			▶	5		



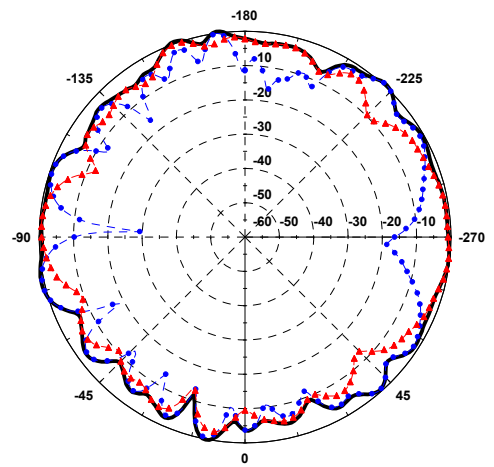
5350 MHz (Max Gain: 1.0dBi)



5350 MHz (Max Gain: 1.5dBi)

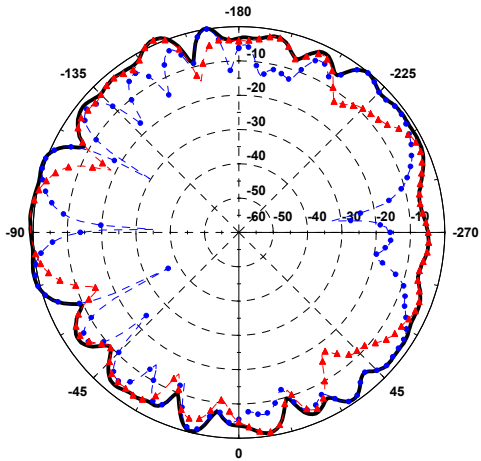


5470 MHz (Max Gain: 2.4dBi)

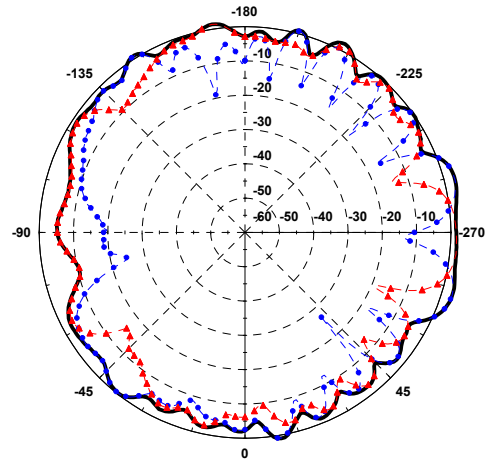


5470 MHz (Max Gain: 0.8dBi)

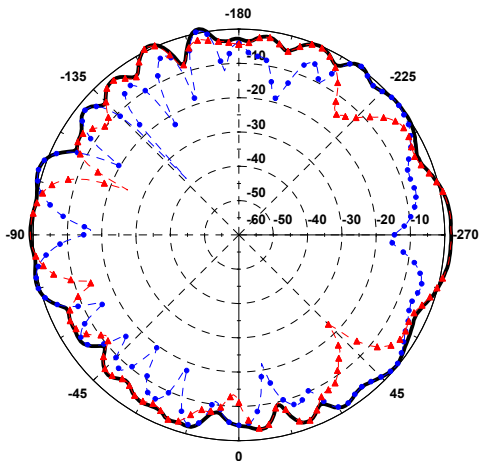
<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b> <b>CAN4313 351 022501B</b> <b>CAN4313 351 032501B</b> <b>CAN4313 351 042501B</b>			—	X04	Jul 24, 03		
							—	2			
							▶	3			
							▶	4			
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	7	SH nr.	—	4	
CHECK				DATE / 日期		Jul. 24, 2003		—	▶	5	



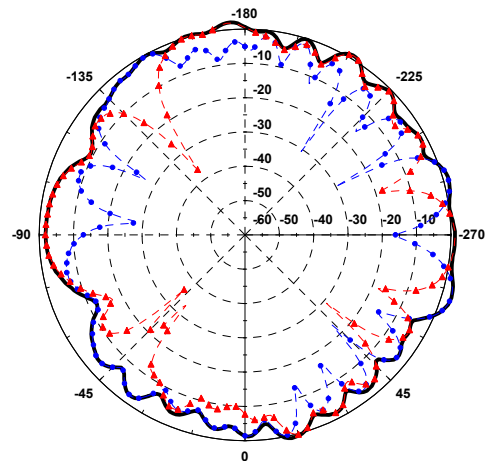
5725 MHz (Max Gain: 3.1dBi)



5725 MHz (Max Gain: 1.4dBi)



5900 MHz (Max Gain: 2.9dBi)



5900 MHz (Max Gain: 1.9dBi)

Note: May vary for different devices

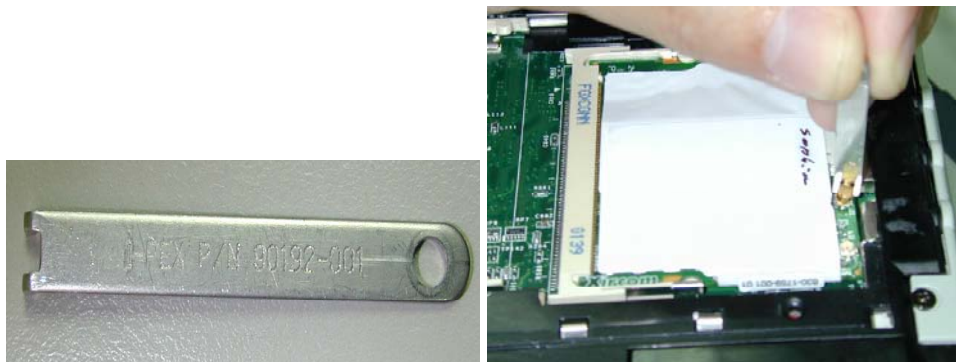
<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b>				—	X04	Jul 24, 03	
				<b>CAN4313 351 022501B</b>				—	2		
				<b>CAN4313 351 032501B</b>				▶	3		
				<b>CAN4313 351 042501B</b>				▶	3		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	8	SH nr.	— ▶	4	
CHECK				DATE / 日期	Jul. 24, 2003			— ▶	5		



### Typical Installation of Antenna and Connectors



### - Notes for Installation and Removal of Cable and Connector



<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B CAN4313 351 022501B CAN4313 351 032501B CAN4313 351 042501B</b>				—	X04	Jul 24, 03	
								—	2		
								▶	3		
								▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	9	SH nr.	▶	4	
CHECK				DATE / 日期	Jul. 24, 2003		▶	5			

**IPRECAUTIONS FOR HANDLING**

◆Connector insertion and extraction  
 a. Connector shall be extracted vertically by specialised extraction JIG.  
 Part No.: E.FL-LP-N (CL Code: CL331-0441-9)  
 U.FL-LP-N-2 (CL Code: CL331-0494-5)  
 Never hold the cable when extracting the cable because it damages the connector.  
 b. Insert the connector as perpendicularly to the mating surface as possible by aligning the mating axes of both connectors. Do not excessively slant the connectors when inserting.  
 ◆Allowable loads on the cable after the connectors are mated.  
 The figures below show the maximum allowable loads on the cable. Do not apply loads exceeding these values to the cable.

Use proper tooling to remove antenna cable such with proper force

**Reliability Data for Connector**

Item	Specification	Conditions	
1. Contact resistance	Center: 20 mΩ max. Outside: 10 mΩ max.	Measured at 10 mA max.	
2. Insulation resistance	500 MΩ min.	Measured at 100 V DC	
3. Withstand voltage	No line or insulation breakdown	200 V AC for 1 minute	
4. V.S.W.R.*	1.3 max.	DC to 3 GHz	
	Dia. 0.81 Cable	1.35	3 to 6 GHz
	Dia. 1.13 Cable	1.4	
	Dia. 1.32 Cable	1.5	
5. Female contact holding force	0.15 N min.	Measured with a φ 0.475 pin gauge	
6. Repetitive operation	Contact resistance 25 mΩ max. (Center) 15 mΩ max. (Outside)	30 cycles of insertion and disengagement	
7. Vibration	No momentary disconnections of 1 μs min. No damage, cracks, or parts looseness min.	Frequency of 10 to 100 Hz, single amplitude of 1.5 mm, acceleration of 59 m/s <sup>2</sup> , for 5 cycles in the direction of each of the 3 axes	
8. Shock	No momentary disconnections of 1 μs min. No damage, cracks, or parts looseness	Acceleration of 735 m/s <sup>2</sup> , 11 ms duration, sine half-wave waveform, for 6 cycles in the direction of each of the 3 axes	
9. Humidity resistance (Steady state)	No damage, cracks, or parts looseness Insulation resistance 100 MΩ min. (High temperature) Insulation resistance 500 MΩ min. (Dry)	Temperature of 40 °C, humidity of 95%, let stand for 96 hours	
10. Temperature cycle	No damage, cracks, or parts looseness Contact resistance 25 mΩ max. (Center) 15 mΩ max. (Outside)	Temperature: +40 °C → 5 to 35 °C → +90 °C → 5 to 35 °C Time: 30 min. → Within 5 min. → 30 min. → Within 5 min. Cycles: 5	
11. Salt spray test	No excessive corrosion	48 hours continuous exposure to 5% salt water	

<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b> <b>CAN4313 351 022501B</b> <b>CAN4313 351 032501B</b> <b>CAN4313 351 042501B</b>			—	X04	Jul 24, 03	
							—	2		
							▶	3		
							▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號	TLL.SH / 共頁	13	PAGE / 頁	10	SH nr.	—	4	
CHECK			DATE / 日期		Jul. 24, 2003			—	5	

**RELIABILITY DATA for Antenna Patch (Reference to IEC Specification)**

IEC 384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHO D	TEST	PROCEDURE	REQUIREMENTS
4.12	4(Na)	Rapid change of temperature	-40 °C (30 minutes) to +90 °C (30 minutes); 5 cycles	No visible damage Central Freq. Change ± 6%
4.14	3(Ca)	Damp heat	500 ± 12 hours at 60 °C; 90 to 95 % RH	No visible damage 2 hours recovery Central Freq. Change ± 6%
4.15		Endurance	500 ± 12 hours at 90 °C;	No visible damage 2 hours recovery Central Freq. Change ± 6%

<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b>			—	X04	Jul 24, 03	
				<b>CAN4313 351 022501B</b>			—	2		
				<b>CAN4313 351 032501B</b>			▶	3		
				<b>CAN4313 351 042501B</b>			▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號	TLL.SH / 共頁	13	PAGE/ 頁	11	SH nr.	— ▶	4	
CHECK				DATE / 日期	Jul. 24, 2003		— ▶	5		

**ORDERING INFORMATION: Yageo P/N Ordering Code**

The antennas may be ordered by using the Yageo P/N ordering code. These code numbers can be determined by the following rules:

CAN4313 3 51 01 250 1B  
 F C M S T A P

F. Family Code

**CAN43** = Antenna

C. Packing Type Code

**13** = Bulk (1000 pcs)

M. Materials Code

**3** = High Frequency Material

S. Size/Series Code

**51** = 64\*7\*0.5 mm Main Antenna; 64\*7\*0.7 mm Aux Antenna

T. Tolerance/Cable

**01** = Cable 1 Main Antenna LCD; **02** = Cable 2 Main Antenna Base

**03** = Cable 3 Aux Antenna LCD; **04** = Cable 4 Aux Antenna Base

A. Working Frequency

**250** = 2.45/5 GHz Triple Band

**Example: 12NC 4313 351 01250**

Product description: Antenna (43) by bulk 1000 pcs (13) of High Frequency Material (3), Size 64\*7\*0.5 mm for size code (51);

Cable (01) for Main LCD Cable;

Working Frequency (250) = 2.45/5.2G Hz

P. Packing

**1B** = 1000 pcs packing

<b>2.45/5GHz P2 Multi Band Antenna                  with Cable &amp; Connector for                  IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b>				—	X04	Jul 24, 03	
				<b>CAN4313 351 022501B</b>				—	2		
				<b>CAN4313 351 032501B</b>				▶	3		
				<b>CAN4313 351 042501B</b>				▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	12	SH nr.	▶	4	
CHECK				DATE / 日期	Jul. 24, 2003		▶	5			

**Revision Control:**

Revision	Date	Content	Remark
X00-P	Apr. 29, 2003	New issued, metal Antenna with Mylar	N/A.
X01-P	May 20, 2003	1. Add a Aluminum foil for extra ground. 2. Radiator pattern changes.	1. Add a Aluminum foil can improve the antenna gain effectively. 2. Radiator pattern changes to improve the VSWR and gain.
X02-P	Jun 25, 2003	1. Radiator pattern changes	1. The shift slight the resonant frequency of 2.4G band of main antenna.
X03-P	Jul 11, 2003	1. M/E changes to Tape free	1. For better installation.
X04-P (A00)	Jul 18, 2003	1. Main base cable length changes. 2. Radiator pattern changes.	1. To fit M/E request. 2. Improve the antenna gain.

<b>2.45/5GHz P2 Multi Band Antenna with Cable &amp; Connector for IEEE802.11b, 11g, 11a, UNII</b>				<b>CAN4313 351 012501B</b>				—	X04	Jul 24, 03	
				<b>CAN4313 351 022501B</b>				—	2		
				<b>CAN4313 351 032501B</b>				▶	3		
				<b>CAN4313 351 042501B</b>				▶	4		
BY / 製定者	Cliff/Howard	SUPER / 原圖編號		TLL.SH / 共頁	13	PAGE/ 頁	13	SH nr.	—	4	
CHECK				DATE / 日期		Jul. 24, 2003			—	5	