

# DATA SHEET

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

Product specification: Version X04 (A00)

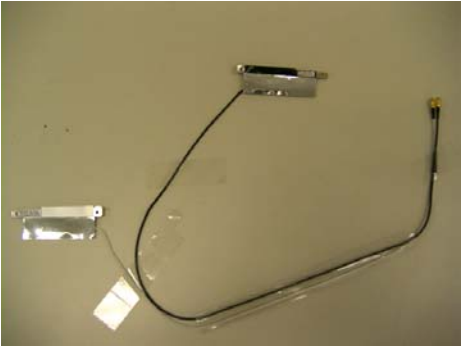
Jul 24, 2003

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

**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<br>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<br>3.1 dBi/5GHz Band                                                                                                                                                        |                                                                                     |
| VSWR                    | 2.0 for 2.45GHz band<br>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.<br>Yegeo/Phycomp Electronics (China) Co, Ltd.<br>No. 10, Zhu Yuan Road, Suzhou New District, Suzhou, PRC |                                                                                     |

|                                                                                                           |              |                 |  |                            |               |            |   |           |     |            |
|-----------------------------------------------------------------------------------------------------------|--------------|-----------------|--|----------------------------|---------------|------------|---|-----------|-----|------------|
| <b>2.45/5GHz P2 Multi Band Antenna<br/>with Cable &amp; Connector for<br/>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 /<br>原圖編號 |  | TLL.SH<br>/ 共頁             | 13            | PAGE/<br>頁 | 2 | SH<br>nr. | ▶   | 5          |
| CHECK                                                                                                     |              |                 |  | DATE / 日期                  | Jul. 24, 2003 |            |   | ▶         | 5   |            |

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

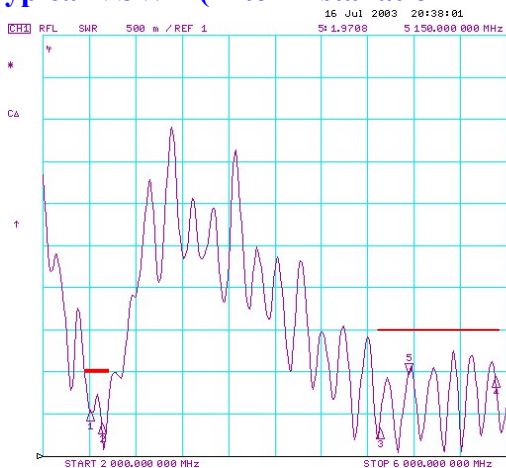


Figure 1: Schematic diagram of the antenna assembly. The diagram shows two views of the antenna assembly. The left view shows the Main Antenna (Left) and Aux Antenna (Right) connected to an MMCX Plug (Male) and MMCX Jack (Female). Dimensions include 350 +/- 4 mm for the main antenna length, 20 mm for the aux antenna length, 35 +/- 2 mm for the MMCX Plug length, and 90 +/- 2 mm for the MMCX Jack length. Cable colors are White and Black. The right view shows the MMCX Jack (Female) and MMCX Plug (Male) connected to a UFL connector. Dimensions include 40 +/- 2 mm for the MMCX Jack length, 180 +/- 4 mm for the UFL connector length, 5 mm for the cable length, and 200 +/- 4 mm for the MMCX Plug length. Cable colors are White and Black. A heat shrink tube or Tape is used for the main antenna cable.

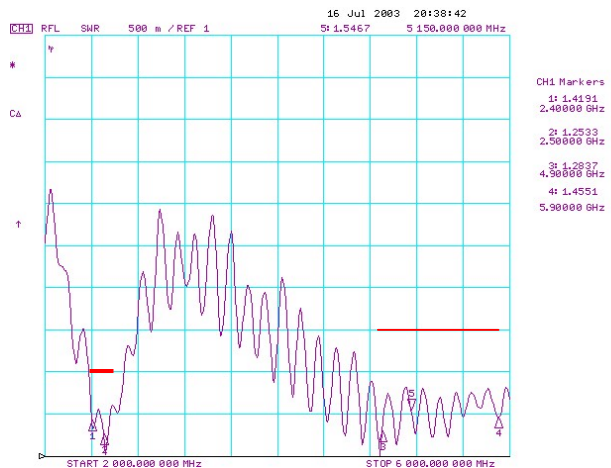
Note: MMCX connector is made of Brass and gold plated with Teflon insulator. Maximum matching force is 3.4 lbs and un-mating force is 1.0~3.0 lbs. Dielectric withstanding voltage 500 Vrms, Insulation Resistance 1000M Ohm. Typical VSWR 1.12 @ 6GHz. Moisture Resistance follows MIL-STD-202, method 106 with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



## Typical VSWR (After Installation in Notebook)



**Main Antenna**

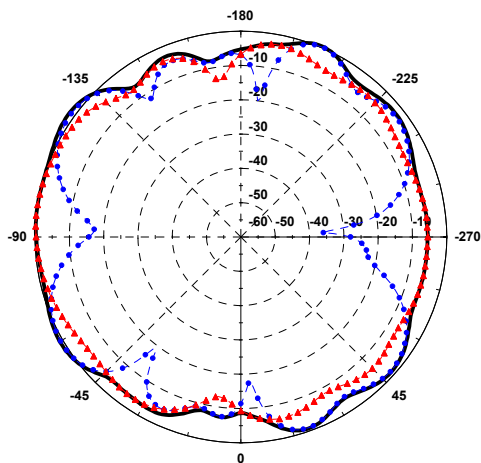


**Aux Antenna**

Note: May vary for different devices

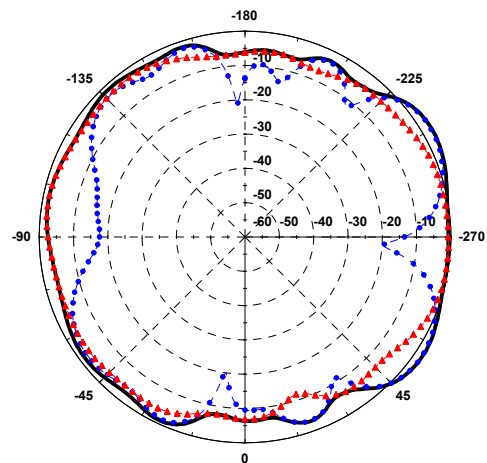
## Typical Radiation Pattern Polar Plot (Based on After Antenna Installation)

- Main



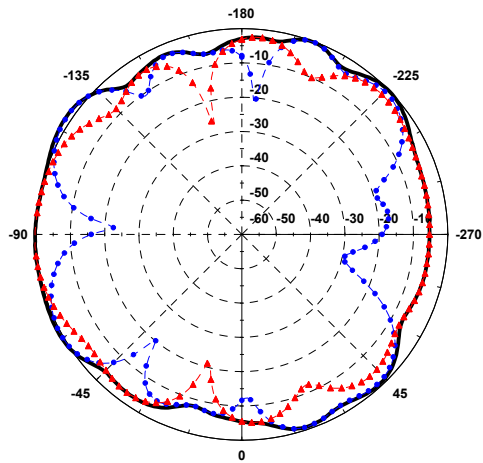
2400 MHz (Max Gain: 2.9dBi)

-Aux Antenna

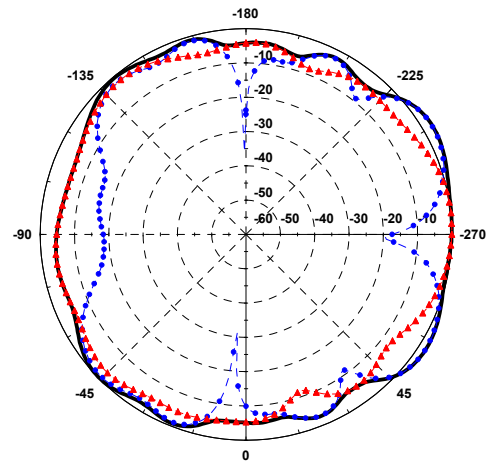


2400 MHz (Max Gain: 1.7dBi)

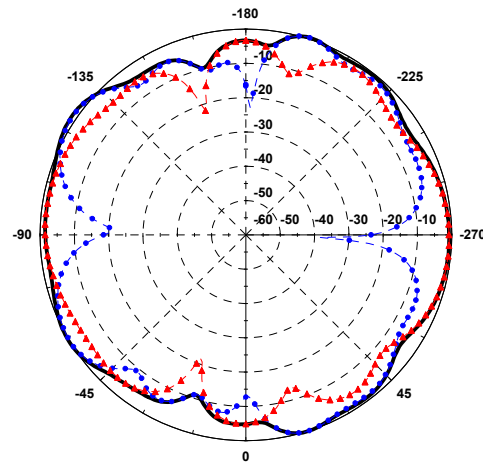
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|                                                                                              |              |                 |  | CAN4313 351 022501B |               |            | — | 2         |            |
|                                                                                              |              |                 |  | CAN4313 351 032501B |               |            | ▶ | 3         |            |
|                                                                                              |              |                 |  | CAN4313 351 042501B |               |            | ▶ | 4         |            |
| BY / 製定者                                                                                     | Cliff/Howard | SUPER /<br>原圖編號 |  | TLL.SH<br>/ 共頁      | 13            | PAGE/<br>頁 | 4 | SH<br>nr. | 4          |
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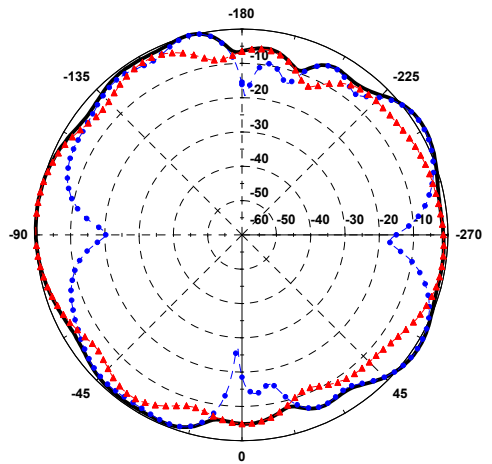
2450 MHz (Max Gain: 2.9dBi)



2450 MHz (Max Gain: 1.6dBi)

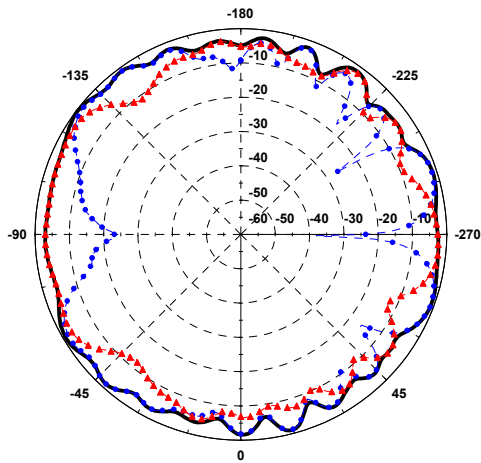


2500 MHz (Max Gain: 1.6dBi)

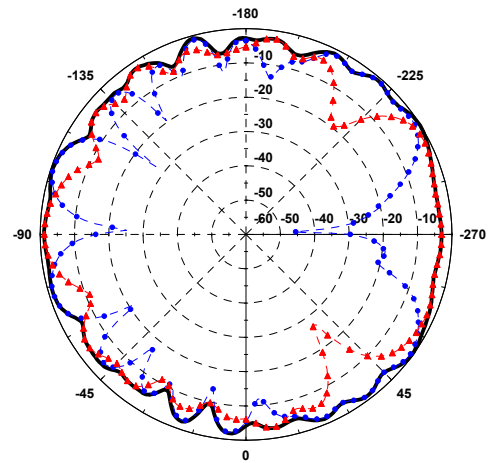


2500 MHz (Max Gain: 1.4dBi)

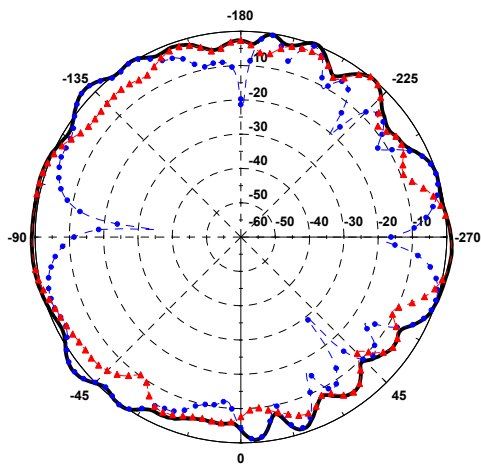
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| BY / 製定者                                                                                     | Cliff/Howard | SUPER /<br>原圖編號 |  | TLL.SH<br>/ 共頁                                                                           | 13 | PAGE/<br>頁    | 5 | SH<br>nr. | —<br>▶ | 4          |  |
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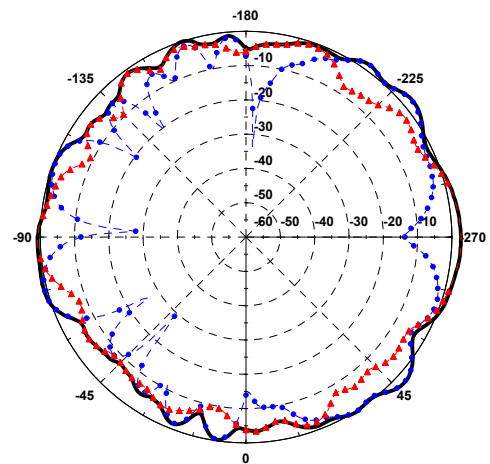
4900 MHz (Max Gain: -0.3dBi)



4900 MHz (Max Gain: -0.1dBi)

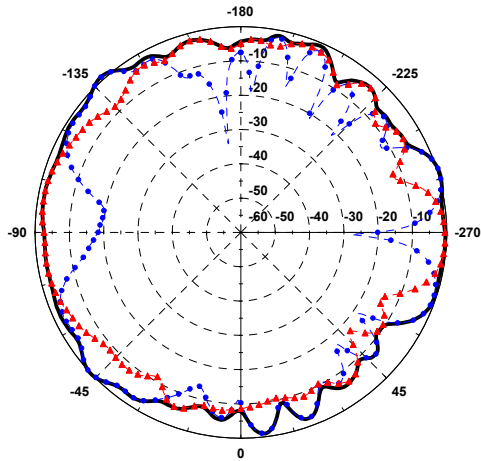


5150 MHz (Max Gain: 2.6dBi)

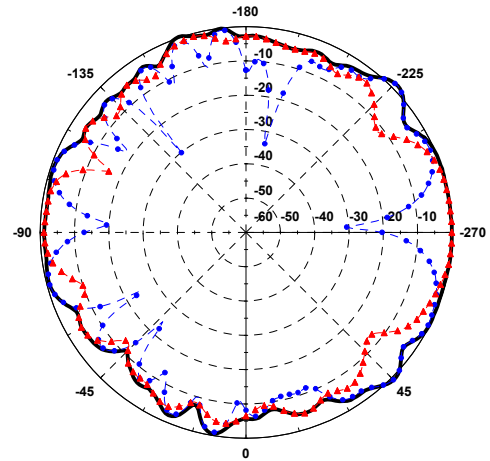


5150 MHz (Max Gain: 2.8dBi)

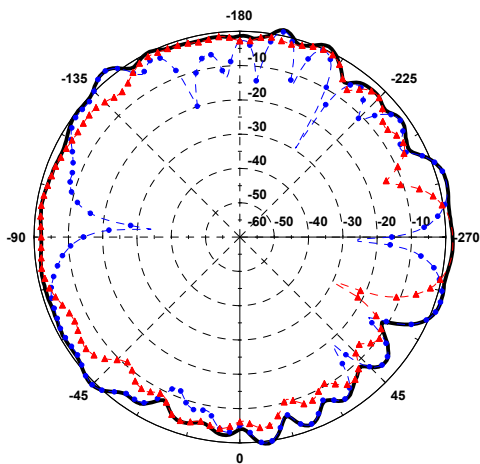
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| BY / 製定者                                                                                     | Cliff/Howard | SUPER /<br>原圖編號 |  | TLL.SH<br>/ 共頁                                                                           | 13 | PAGE/<br>頁    | 6 | SH<br>nr. | —<br>▶ | 4          |  |
| CHECK                                                                                        |              |                 |  | DATE / 日期                                                                                |    | Jul. 24, 2003 |   |           | —<br>▶ | 5          |  |



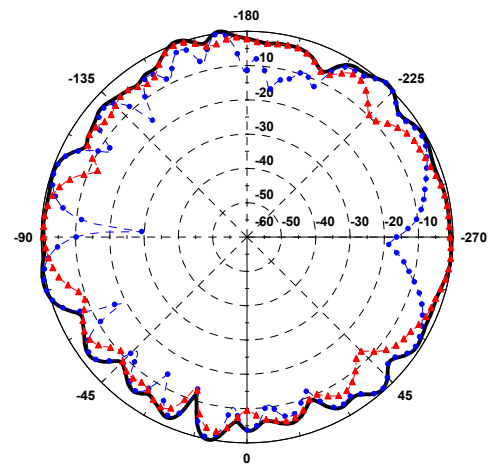
5350 MHz (Max Gain: 1.0dBi)



5350 MHz (Max Gain: 1.5dBi)

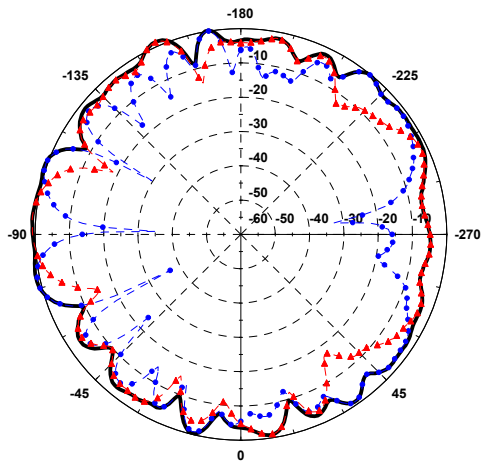


5470 MHz (Max Gain: 2.4dBi)

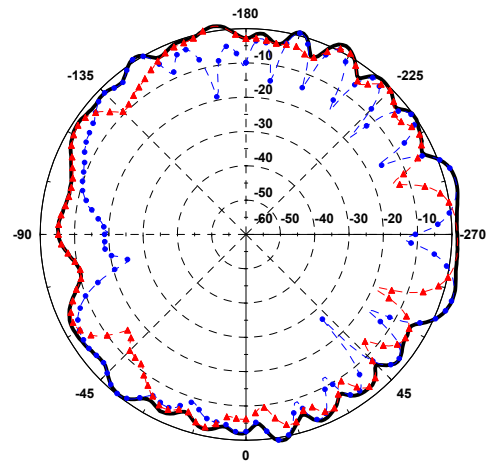


5470 MHz (Max Gain: 0.8dBi)

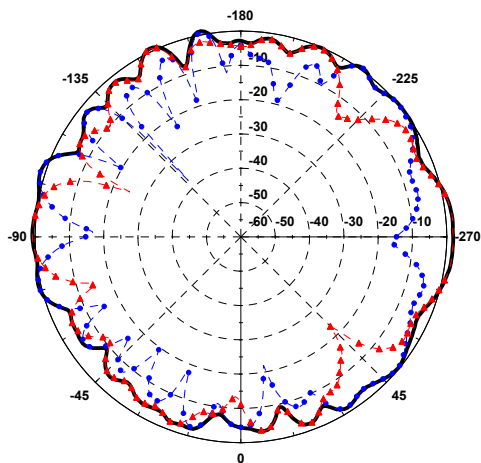
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| BY / 製定者                                                                                     | Cliff/Howard | SUPER /<br>原圖編號 |  | TLL.SH<br>/ 共頁                                                                           | 13 | PAGE/<br>頁    | 7 | SH<br>nr. | —   | 5          |
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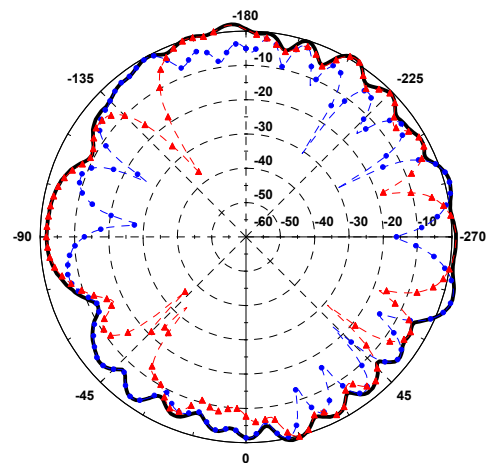
5725 MHz (Max Gain: 3.1dBi)



5725 MHz (Max Gain: 1.4dBi)



5900 MHz (Max Gain: 2.9dBi)



5900 MHz (Max Gain: 1.9dBi)

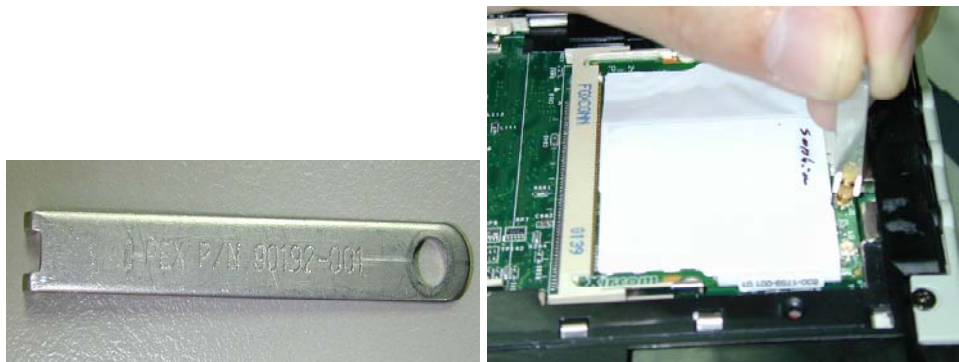
Note: May vary for different devices

|                                                                                              |              |                 |  |                                                                                          |    |               |   |           |     |            |
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| BY / 製定者                                                                                     | Cliff/Howard | SUPER /<br>原圖編號 |  | TLL.SH<br>/ 共頁                                                                           | 13 | PAGE/<br>頁    | 8 | SH<br>nr. | —   | 5          |
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## Typical Installation of Antenna and Connectors

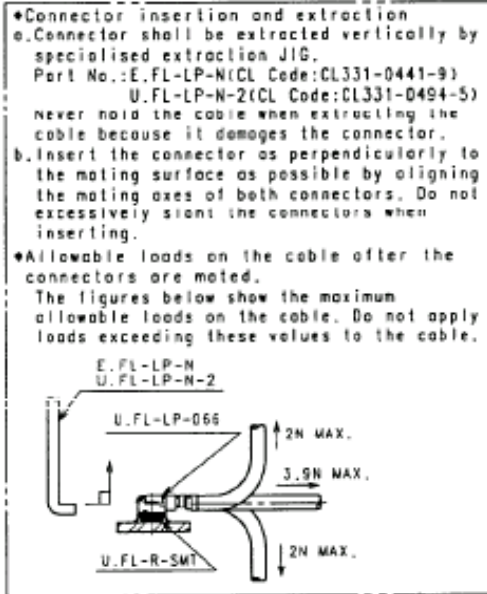


## - Notes for Installation and Removal of Cable and Connector



|                                                                                              |              |                 |  |                                                                                          |    |               |   |           |     |            |  |
|----------------------------------------------------------------------------------------------|--------------|-----------------|--|------------------------------------------------------------------------------------------|----|---------------|---|-----------|-----|------------|--|
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| BY / 製定者                                                                                     | Cliff/Howard | SUPER /<br>原圖編號 |  | TLL.SH<br>/ 共頁                                                                           | 13 | PAGE/<br>頁    | 9 | SH<br>nr. | —   | 4          |  |
| CHECK                                                                                        |              |                 |  | DATE / 日期                                                                                |    | Jul. 24, 2003 |   |           | —   | 5          |  |

# IPRECAUTIONS FOR HANDLING



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.<br>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.0.81Cable                                                                                                                            | 1.35 | 3 to 6 GHz                                                                                                                                       |
|                                       | Dia.1.13Cable                                                                                                                            | 1.4  |                                                                                                                                                  |
|                                       | Dia.1.32Cable                                                                                                                            | 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)<br>15 mΩ max. (Outside)                                                                           |      | 30 cycles of insertion and disengagement                                                                                                         |
| 7. Vibration                          | No momentary disconnections of 1 μs min.<br>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.<br>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<br>Insulation resistance 100 MΩ min. (High temperature)<br>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<br>Contact resistance 25 mΩ max. (Center)<br>15 mΩ max. (Outside)                                  |      | Temperature: +40°C → 5 to 35°C → +90°C → 5 to 35°C<br>Time: 30 min. → Within 5 min. → 30 min. → Within 5 min.<br>Cycles: 5                       |
| 11. Salt spray test                   | No excessive corrosion                                                                                                                   |      | 48 hours continuous exposure to 5% salt water                                                                                                    |

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

| IEC<br>384-10/<br>CECC 32<br>100<br>CLAUSE | IEC<br>60068-2<br>TEST<br>METHO<br>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<br>Central Freq. Change<br>± 6%                     |
| 4.14                                       | 3(Ca)                                | Damp heat                   | 500 ± 12 hours at 60 °C;<br>90 to 95 % RH            | No visible damage<br>2 hours recovery<br>Central Freq. Change<br>± 6% |
| 4.15                                       |                                      | Endurance                   | 500 ± 12 hours at 90 °C;                             | No visible damage<br>2 hours recovery<br>Central Freq. Change<br>± 6% |

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

|                                                                                              |              |                 |  |                                                                                          |    |               |    |           |        |            |  |
|----------------------------------------------------------------------------------------------|--------------|-----------------|--|------------------------------------------------------------------------------------------|----|---------------|----|-----------|--------|------------|--|
| 2.45/5GHz P2 Multi Band Antenna<br>with Cable & Connector for<br>IEEE802.11b, 11g, 11a, UNII |              |                 |  | CAN4313 351 012501B<br>CAN4313 351 022501B<br>CAN4313 351 032501B<br>CAN4313 351 042501B |    |               |    | —         | X04    | Jul 24, 03 |  |
|                                                                                              |              |                 |  |                                                                                          |    |               |    | —<br>▶    | 2      |            |  |
|                                                                                              |              |                 |  |                                                                                          |    |               |    | —<br>▶    | 3      |            |  |
|                                                                                              |              |                 |  |                                                                                          |    |               |    |           |        |            |  |
| BY / 製定者                                                                                     | Cliff/Howard | SUPER /<br>原圖編號 |  | TLL.SH<br>/ 共頁                                                                           | 13 | PAGE/<br>頁    | 12 | SH<br>nr. | —<br>▶ | 4          |  |
| CHECK                                                                                        |              |                 |  | DATE / 日期                                                                                |    | Jul. 24, 2003 |    |           | —<br>▶ | 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.<br>2. Radiator pattern changes. | 1. Add a Aluminum foil can improve the antenna gain effectively.<br>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.<br>2. Radiator pattern changes.       | 1. To fit M/E request.<br>2. Improve the antenna gain.                                                                        |

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