

# Data Sheet

(Mechanical Use)

Product Type	WLAN Antenna
Notebook Model Number	ASUS / UX20
Part No. / Yageo / Main	CAN4313 820 012701B
Part No. / ASUS / Main	

**Yageo (Taiwan) Ltd.**

16, west 3rd Street, N.E.P.Z Kaohsiung, 811 Taiwan, R.O.C

**Yageo Electronics (China) Co, Ltd**

No. 10, Zhu Yuan Road, Suzhou New District, Suzhou, PRC

Multiple Bands Antenna for WLAN Applications	Yageo Corporation SPD		R01	Sep. 25, 08
	Datasheet Current Revision:			
	<b>R01</b>			
	BY /	<b>Candy Lin</b>	DATE /	<b>Sep. 25, 2008</b>

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# 1. Specifications

## 1.1 Specifications for Antennas

Frequency Range (GHz)	2.40 ~ 2.50 / 5.15 ~ 5.85
VSWR	2.5 : 1 max
Peak Gain	0.41 dBi for 2.4~2.5GHz band 1.73 dBi for 5.15~5.85GHz band
Radio Connector	Hirose U.FL or IPex MHF
Impedance	50Ω Nominal.
Antenna Type	PIFA Antenna
Cable Diameter	1.37 mm
Cable Color	Black for Main WLAN
Operating Temperature	-40~90°C
Maximum Power	1W
Polarization	Linear
Radiation Pattern	Omni-directional

## 1.2 Antenna Dimension / Cable Length

Product	ASUS / UX20
Main Antenna (LCD)	40*8*0.4 mm / 330.0 mm, Color Black

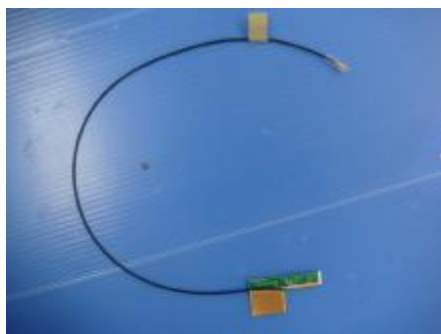
## 1.3 Packing Spec.

Product	For Example
Inner Tray	60
Carton Box	265*100

**Note: Real packing will base on current project type and samples quantity to definition.**



## 1.4 Antenna Pictures



## **2. Test Methodology**

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### **2.1 Test Equipment**

The equipment for the antenna measurement we used is as follows:

- A. Network Analyzer, support up to 8GHz, to measure the VSWR and input impedance of antenna.
- B. Three-dimensional anechoic chamber to measure antenna gain and radiation pattern (Standard horn antenna was used to calibrate the chamber)
- C. Digital caliper to measure the dimensions.
- D. Climatic chamber for mechanical tests.

### **2.2 Test Setup**

#### **2.2.1 Frequency Range**

**2.40~2.70GHz, 5.15 ~ 5.85GHz for WLAN / Wimax application.**

**2400~2484MHz for Bluetooth application.**

**3168~4752MHz , 6336~7920MHz for Ultra-Wide Band application.**

**824~960MHz, 1710~2170MHz for WWAN application**

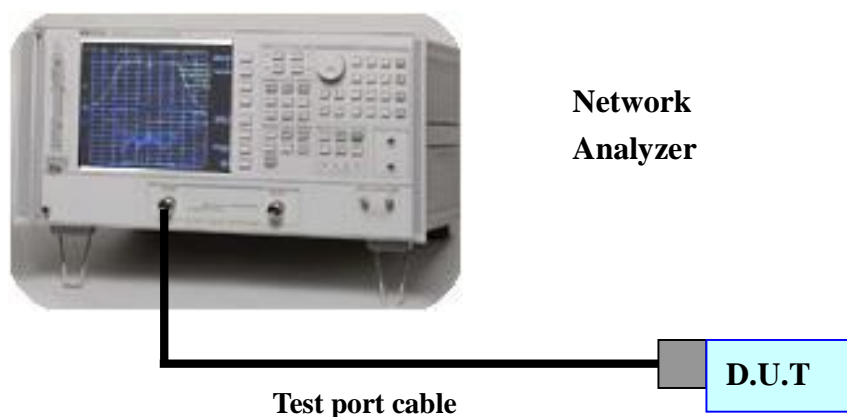
**1575MHz for GPS application**

#### **2.2.2 Antenna Configuration**

The antenna basically has two parts; the stamping and the cable assembly with the connector on one side. The detailed drawing is attached.

#### **2.2.3 VSWR**

The VSWR is measured with network analyzer that support up to 8GHz. All the measurements are performed with the customer provided fixture. Figure 1 shows the typical schematic diagram for measuring VSWR.



**Figure 1. The schematic diagram for measuring VSWR**

### 2.2.4 Radiation Pattern and Gain

The radiation pattern of antenna is measured in both horizontal polarization and vertical polarization. The radiation pattern measurements are performed in the three-dimensional anechoic chamber. The chamber provides less than  $-30\text{dB}$  reflectivity from  $800\text{MHz}$  through  $8\text{GHz}$ . The chamber is calibrated using both standard dipole antenna and horn antenna. The Gain here is expressed as  $\text{dBi}$  that standardizes the isotropic antenna. The Gain measurements and antenna radiation pattern are also performed in the same chamber described previously. Figure 2 shows the schematic diagram for measuring radiation pattern and Gain.

#### 3D Anechoic Chamber

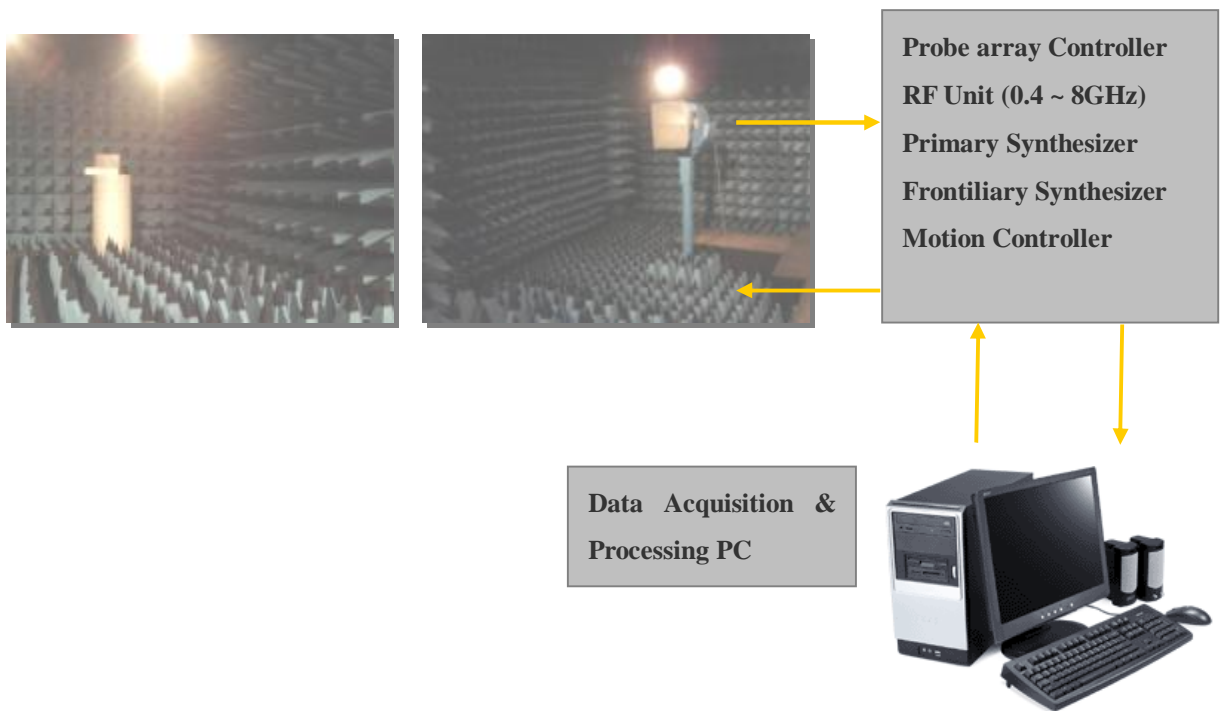
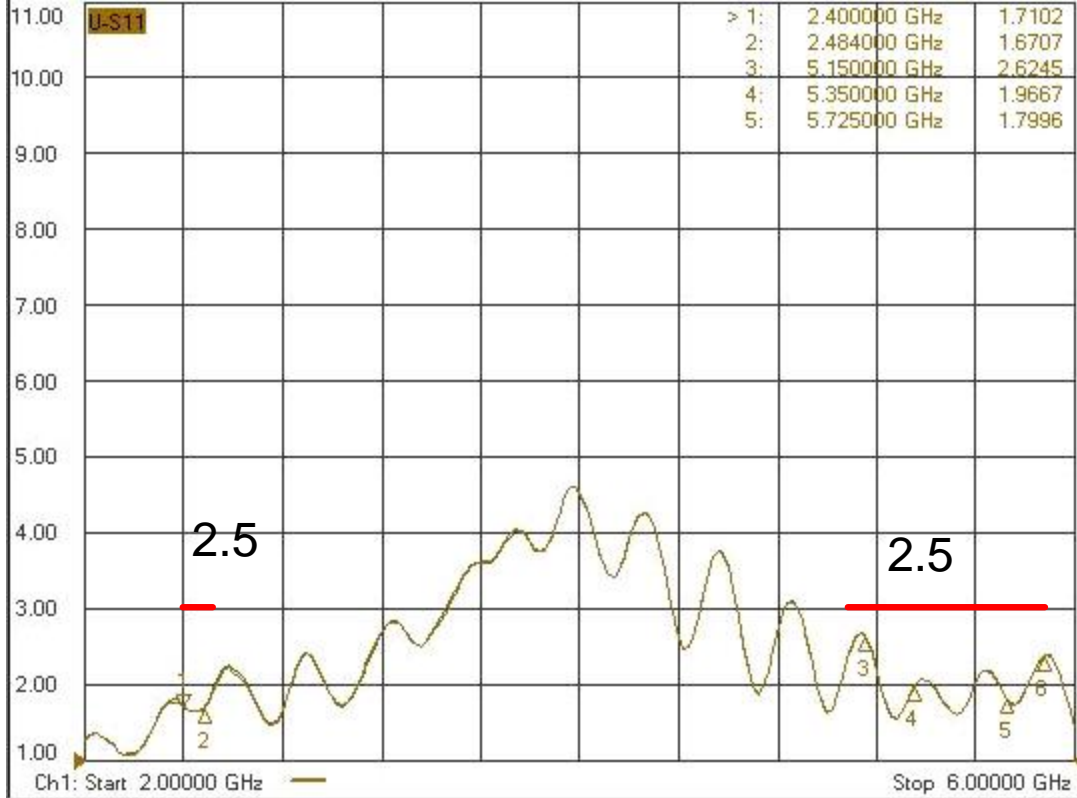


Figure 2. The schematic diagram for measuring radiation pattern and Gain

### 3. Performance Data

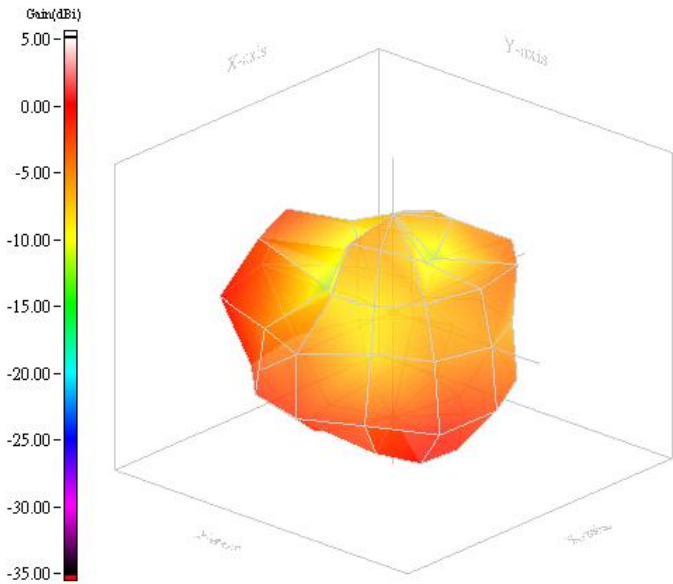
#### 3.1 VSWR in the Fixture of Main Antenna



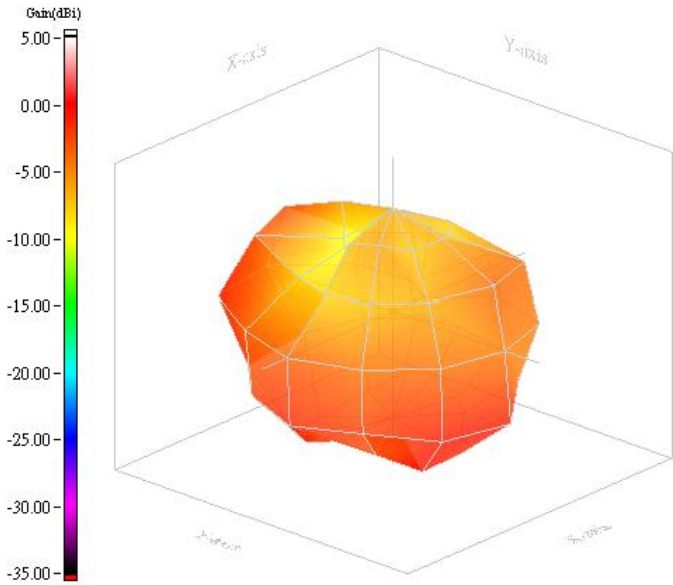
### 3.2 Radiation Pattern and Gain

#### 3.2.1 Low Frequency (2.40GHz~2.50GHz) / Main Antenna

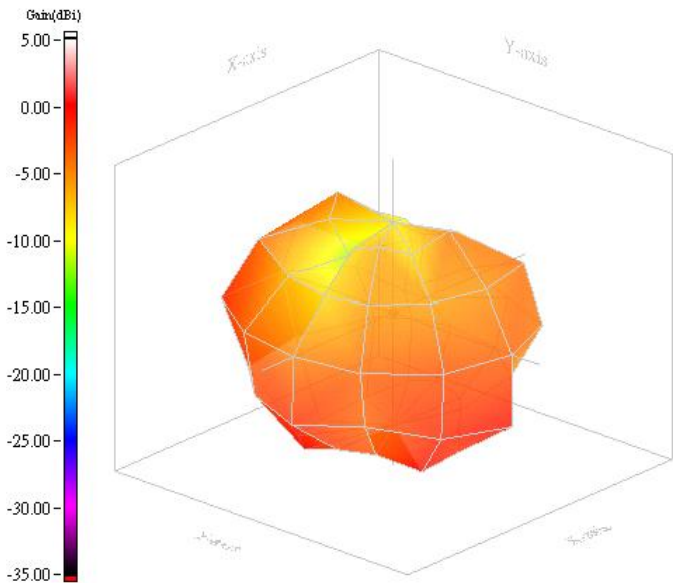
WL Main @ 2.40GHz



WL Main @ 2.45GHz



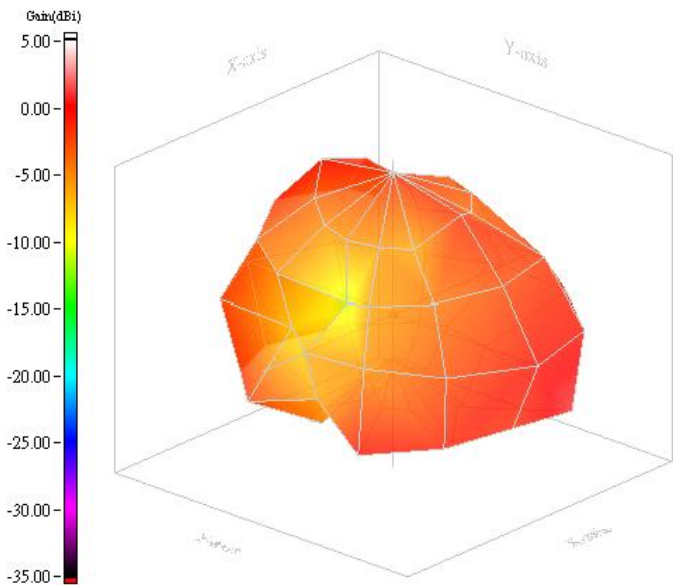
WL Main @ 2.50GHz



- **Horizontal**
- **Vertical**
- **H+V**

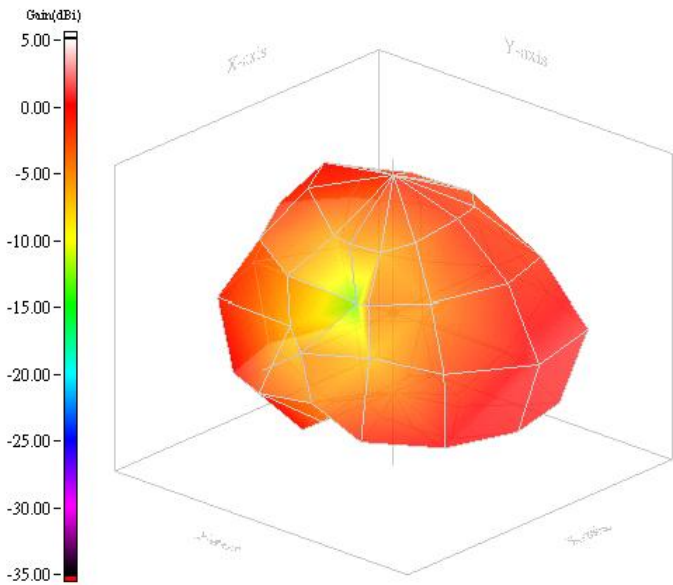
**3.2.2 Middle Frequency (5.15GHz~5.35GHz) / Main Antenna**

WL Main @ 5.15GHz

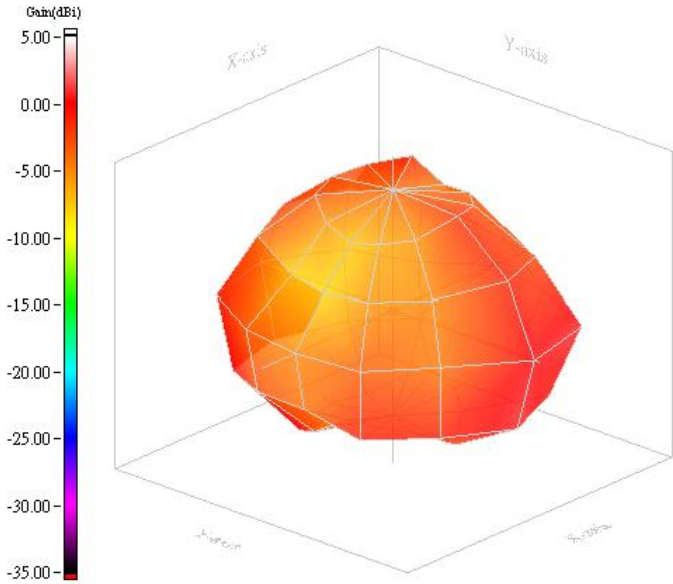




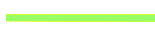


WL Main @ 5.25GHz



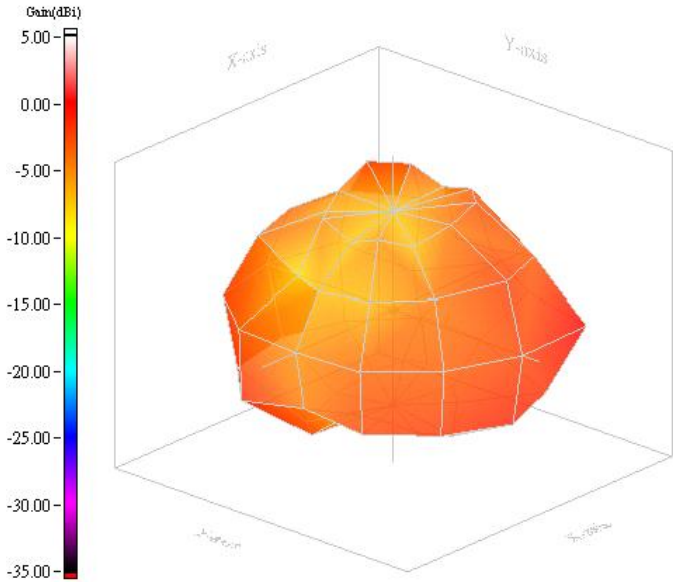
WL Main @ 5.35GHz



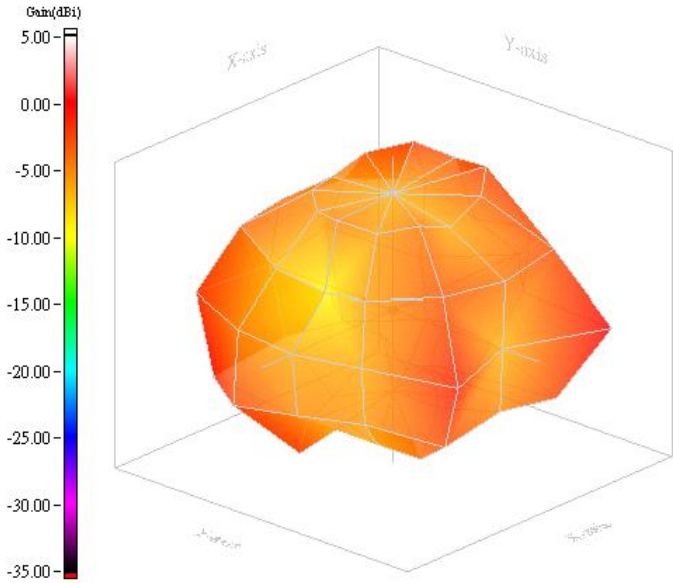
-  **Horizontal**
-  **Vertical**
-  **H+V**

**3.2.3 High Frequency (5.47GHz~5.85GHz) / Main Antenna**

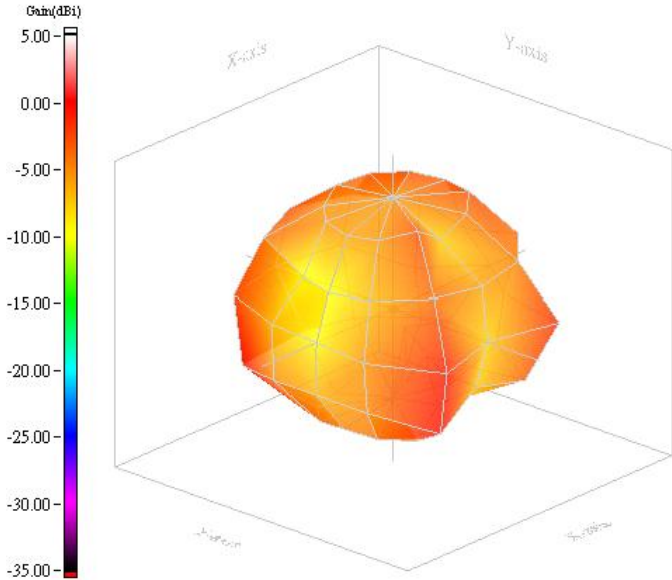
WL Main @ 5.47GHz



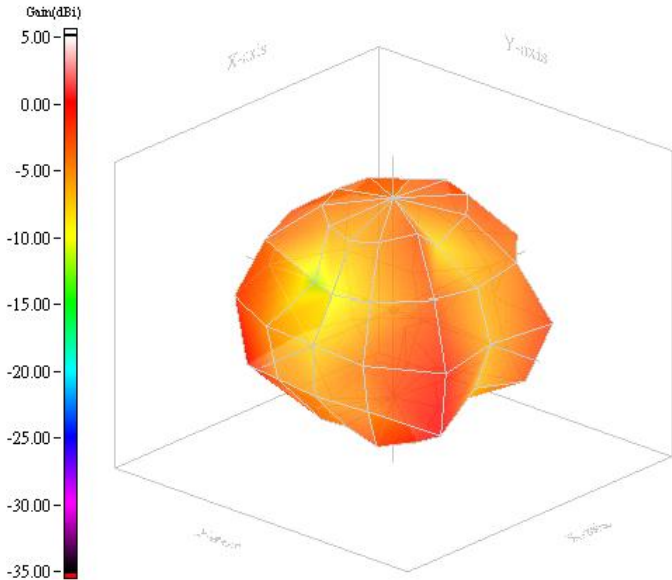
WL Main @ 5.60GHz



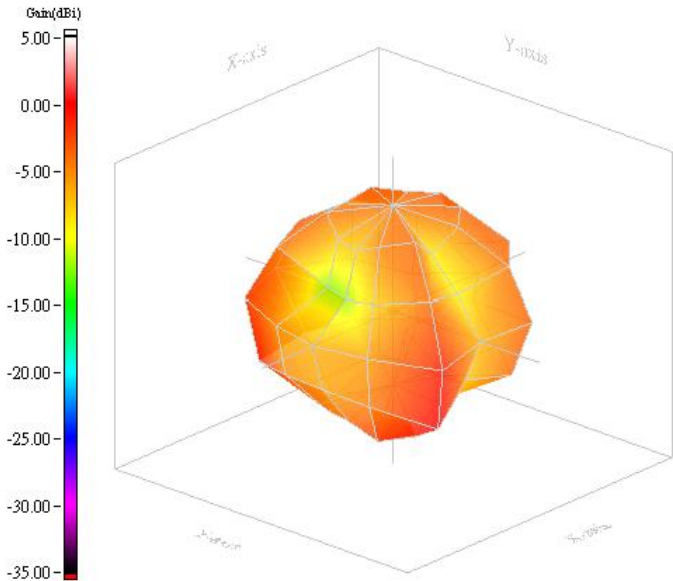
WL Main @ 5.725GHz



WL Main @ 5.785GHz



WL Main @ 5.85GHz

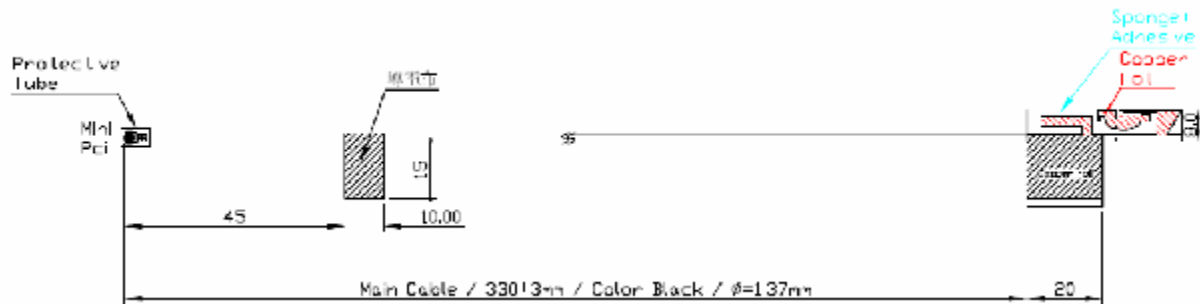


- **Horizontal**
- **Vertical**
- **H+V**

### 3.2.4 Average Gain (dBi) Summary

WLAN Main Antenna Gain								
Frequency	Peak(dBi)			Average(dBi)				
	H-pol	V-pol	Total	H-pol	V-pol	Total	3D Gain	Efficiency%
2400 MHz	-0.10	-6.38	0.41	-6.07	-10.50	-4.73	-4.76	33.46
2450 MHz	-1.31	-4.89	-0.92	-5.67	-10.70	-4.48	-4.70	33.90
2500 MHz	-1.36	-5.31	-1.11	-5.59	-11.53	-4.61	-4.88	32.49
5150 MHz	-2.59	-0.99	1.29	-5.94	-6.13	-3.02	-3.35	46.29
5250 MHz	-1.03	0.54	1.73	-5.38	-5.77	-2.56	-2.76	52.93
5350 MHz	-0.98	-0.28	0.78	-5.26	-5.97	-2.59	-3.07	49.34
5470 MHz	-1.22	-1.95	-0.03	-6.41	-6.62	-3.51	-4.11	38.78
5600 MHz	-1.36	-2.19	-0.01	-6.47	-6.75	-3.60	-4.42	36.18
5725 MHz	-2.48	-1.82	-1.04	-7.55	-7.27	-4.39	-4.85	32.71
5785 MHz	-1.66	-0.85	-0.31	-6.81	-6.54	-3.66	-4.35	36.71
5850 MHz	-0.57	-0.57	-0.22	-7.02	-6.74	-3.87	-4.74	33.61

## 4. Antenna Drawing



## 5. Reliability Data For Antenna Patch (Reference To IEC)

IEC 384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	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 40 °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%

## **6. Ordering Information: Yageo Ordering P/N 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    8 20    01 270 1B**  
**F C    MS    T A P**

**F. Family Code**

**CAN43 = Antenna**

**C. Packing Type Code**

**13 = Carton**

**M. Materials Code**

**8 = Coaxial Cable**

**S. Size/Series Code**

**20 = UX20**

**T. Left Antenna/Right Antenna**

**01 = WL Main Left Top Antenna**

**A. Working Frequency**

**270 = WLAN**

**P. Packing**

**1B = 1000 pcs packing**

**7. Revision Control**

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<b>Revision</b>	<b>Date</b>	<b>Content</b>	<b>Remark</b>
R01	Sep. 25, 2008	New Issued, PCB Antenna	N/A.



## 8. UL Card

### I-Pex Connector

No.06027-1  
Feb / 26/08

材料証明書  
MATERIAL CERTIFICATE

当社製品には下記の材料が使われている事を証明致します。  
WE HEREBY CERTIFY THAT THE FOLLOWING MATERIALS ARE USED IN OUR PRODUCT.

PRODUCT NAME : MHF series micro coaxial connector PLUG & RECEPTACLE VERTICAL

Plug, Non halogen free type

Part No.	Contents	Housing	Contact	Ground contact
20278-101R-08	材質名/ Material	PBT	Phosphor bronze	Phosphor bronze
20278-111R-08				
20278-101R-13	型名/ Cat No.	DURANEX 3116	C5210R-H	C5191R-1/2H
20278-111R-13				
20278-101R-32	材料メーカー	WINTECH POLYMER LTD.	Nippon Mining & Metals Co.,Ltd.	HARADA METAL INDUSTRY Co.,Ltd.
20278-111R-32	Manufacturer			
20278-101R-18				
20278-111R-18	UL94難燃性	V-0	-----	-----
20308-101R-13	UL94 flame			
20308-111R-13	class			
20308-101R-32				
20308-111R-32	UL file No.	E213445	-----	-----
20351-101R-37				
20351-111R-37				

※添付資料 : ULカード写し/UL CARD COPY

Plug, Halogen free type

Part No.	Contents	Housing	Contact	Ground contact
20278-102R-08	材質名/ Material	PBT	Phosphor bronze	Phosphor bronze
20278-112R-08	型名/ Cat No.	XFR4840 GF10	C5210R-H	C5191R-1/2H
20278-102R-13	材料メーカー	WINTECH POLYMER LTD.	Nippon Mining & Metals Co.,Ltd.	HARADA METAL INDUSTRY Co.,Ltd.
20278-112R-13	Manufacturer			
20278-102R-32	UL94難燃性	V-0	-----	-----
20278-112R-32	UL94 flame			
20278-102R-18	class			
20278-112R-18	UL file No.	E213445	-----	-----
20351-102R-37				
20351-112R-37				

※添付資料 : ULカード写し/UL CARD COPY

QMFZ2 Component - Plastics				Friday, October 24, 2003			E213445		
<b>WINTECH POLYMER LTD</b>									
18-1 KONAN 2-CHOME MINATO-KU TOKYO 108-8280 JP									
Material Designation: <b>3118(a)</b>									
Product Description: Polybutylene Terephthalate (PBT), designated "Duranex" furnished as pellets.									
<b>Color</b>	<b>Min. Thk. (mm)</b>	<b>Flame Class</b>	<b>HWI</b>	<b>HAI</b>	<b>RTI Elec</b>	<b>RTI Imp</b>	<b>RTI Str</b>	<b>IEC GWIT</b>	<b>IEC GWFI</b>
ALL	0.75	V-0	4	0	130	-	130	-	-
	1.5	V-0	3	0	130	120	130	-	-
NC, BK	3	5VA	2	0	130	120	130	-	-
<b>CTI: 2</b>	<b>IEC CTI (V): -</b>	<b>HVTR: 3</b>	<b>D495: 6</b>			<b>IEC Ball Pressure (°C): -</b>			
<b>Dielectric Strength (kV/mm): 23</b>			<b>Volume Resistivity (10<sup>9</sup>ohm-cm): 16</b>				<b>Dimensional Stability(%):0.0</b>		
<b>ISO Tensile Strength (MPa): -</b>			<b>ISO Flexural Strength (MPa): -</b>				<b>ISO Heat Deflection (C): -</b>		
<b>ISO Tensile Impact (kJ/m<sup>2</sup>): -</b>			<b>ISO Izod Impact (kJ/m<sup>2</sup>): -</b>				<b>ISO Charpy Impact(kJ/m<sup>2</sup>): -</b>		
(e) Virgin and regrind from 1 to 50 by weight incl. have the same basic material characteristics (at a minimum thickness of 0.75 mm), except for 310EP which has a lower as received Tensile Impact value from 26 to 50 percent regrind.									
Report Date: 11/15/2000					Underwriters Laboratories IncR				
UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in components and parts of end-product devices and appliances, where the acceptability of the combination is determined by ULL									

Component - Plastics

E213445

**WINTECH POLYMER LTD**

18-1 KONAN 2-CHOME, MINATO-KU, TOKYO 108-8280 JP

**XFR 4840 GF10**

Polybutylene Terephthalate (PBT), "Duranex", furnished as pellets

Color	Min Thk (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str
ALL	0.75	V-0	1	0	75	75	75
	1.5	V-0	1	0	75	75	75
	3.0	V-0	1	0	75	75	75

Comparative Tracking Index (CTI): **1**

Dimensional Stability (%): -

High-Voltage Arc Tracking Rate (HVTR): **0**

High Volt, Low Current Arc Resis (D495): **5**

Dielectric Strength (kV/mm): **24**

Volume Resistivity (10<sup>9</sup>ohm-cm): **14**

UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by ULL.

Report Date: 2006-07-24  
Last Revised: 2006-07-25

Underwriters Laboratories Inc®



**IEC and ISO Test Methods**

Test Name	Test Method	Units	Thickness Tested (mm)	Value
<b>IEC Flammability</b>	<b>IEC 60695-11-10</b>	<b>Class (color)</b>	<b>0.75</b>	<b>V-0 (ALL)</b>
			<b>1.5</b>	<b>V-0 (ALL)</b>
			<b>3.0</b>	<b>V-0 (ALL)</b>
<b>Glow-Wire Flammability (GWFI)</b>	<b>IEC 60695-2-12</b>	<b>C</b>	-	-
<b>Glow-Wire Ignition (GWIT)</b>	<b>IEC 60695-2-13</b>	<b>C</b>	-	-
<b>IEC Comparative Tracking Index</b>	<b>IEC 60112</b>	<b>Volts (Max)</b>	-	-
<b>IEC Ball Pressure</b>	<b>IEC 60695-10-2</b>	<b>C</b>	-	-
<b>ISO Heat Deflection (1.80 MPa)</b>	<b>ISO 75-2</b>	<b>C</b>	-	-
<b>ISO Tensile Strength</b>	<b>ISO 527-2</b>	<b>MPa</b>	-	-
<b>ISO Flexural Strength</b>	<b>ISO 178</b>	<b>MPa</b>	-	-
<b>ISO Tensile Impact</b>	<b>ISO 8256</b>	<b>kJ/m2</b>	-	-
<b>ISO Izod Impact</b>	<b>ISO 180</b>	<b>kJ/m2</b>	-	-
<b>ISO Charpy Impact</b>	<b>ISO 179-2</b>	<b>kJ/m2</b>	-	-

Underwriters Laboratories Inc®

Nissei Cable

04-12-20:14:18 :NISSEI ELECTRIC GOLDEN TACT :053 485 8908 # 1 / 1

**AVLV2** July 24, 2004  
 Appliance Wiring Material - Component  
**NISSEI ELECTRIC CO LTD** E56198  
 RYUYO FACTORY 206-1 AZA-OHNISHI, MATSUMOTO IWATA-  
 GUN, RYUYO-CHO, SHIZUOKA 438-0206 JAPAN

Table of Recognized Styles

Single-conductor, thermoplastic insulation.							
1164	1331	1516	1609	1727	1907	10504	10653
1180	1332	1517	1610	1827	19109	10508	10654
1198	1333	1528	1637	1828	19231	10509	10655
1199	1334	1538	1671	1829	19248	10510	10656
1212	1358	1577	1664	1847	19315	10516	10657
1213	1371	1584	1709	1943	19344	10599	10730
1226	1398	1586	1710	1948	19386	10607	10734
1227	1512	1591	1723	1959	19443	10608	10735
1330	1543	1592	1726	1986	19485	10617	10736
Multiple-conductor, thermoplastic insulation.							
2095	2384	2516	2598	2669	2843	2995	21007
2096	2385	2517	2614	2764	2854	2994	21111



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**AVLV2** July 24, 2004  
 Appliance Wiring Material - Component  
**NISSEI ELECTRIC CO LTD** E56198

Table of Recognized Styles							
2097	2386	2520	2626	2709	2876	30002	21112
2098	2387	2519	2630	2725	2934	30007	21113
2099	2388	2520	2631	2726	2935	30278	21242
2100	2440	2570	2677	2778	2936	30399	21243
2101	2462	2571	2683	2780	2937	30535	21256
2102	2463	2574	2684	2786	2938	30708	
2103	2464	2576	2685	2787	2961	30897	
2343	2490	2584	2656	2789	2969	30898	
2344	2495	2586	2660	2805	2990	30899	
2345	2501	2587	2661	2841	2991	30900	
2346	2502	2589	2662	2842	2992	30901	
Single-conductor, thermoplastic insulation.							
3068	3074	3126	3138	3243	3329	3503	3507
3069	3075	3132	3139	3301	3367	3543	3723
3070	3122	3133	3172	3305	3422	3570	3724
3071	3125	3135	3259	3318	3488	3579	3725
Single and multiple-conductor specialty items.							
5145	5187	5228	5226	5228	5230	5233	

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**AVLV2** July 24, 2004  
 Appliance Wiring Material - Component  
**NISSEI ELECTRIC CO LTD** E56198

Table of Recognized Styles						
5140	5223	5225	5227	5229	5231	5237

Marking: Company name, voltage rating, temperature rating, conductor size, conductor material if other than copper, and use.  
**LOOK FOR THE RECOGNITION MARK See General Information Preceding These Recognitions**  
 For use only with equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

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Marking: Company name or trademark "SC" in a square and laminating adhesive designation on packaging, roll core or release liner.

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## Protective Tube

YDPU2.E203950 - Tubing, Extruded Insulating - Component

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#### Tubing, Extruded Insulating - Component

[See General Information for Tubing, Extruded Insulating - Component](#)

#### SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD

E203950

XINWEI INDUSTRIAL PARK, WOER MANSION  
NANSHAN DISTRICT, XILI  
SHENZHEN, GUANGDONG 518052 CHINA

Cat. No.	Max V	Max Temp C	Col Recognized	Max Temp Rated Oil Resistance C	VW-1 Rated #
<b>Heat-Shrinkable Polyolefin Tubing</b>					
RSFR-x	600	125	Black	None	Yes
RSFR-x	600	125	White	None	Yes
WKZM-x-yz	600	125	White	None	No
RSFR-H\$	600	125	All except Clear	None	No
RSFR(CB)	300	125	All except Clear	None	Yes
<b>Not Heat-Shrinkable PTFE Tubing</b>					
WF	600	200	Natural	None	Yes
<b>Heat-Shrinkable Polyolefin Tubing with Meltable Liner</b>					
SBRS	600	105	All except Clear	None	Yes
<b>Not Heat-Shrinkable Standard Wall Silicone Tubing</b>					
WST-600	600	150	White	None	No

x - Designated tubing expanded ID. For Black color tubing, x represents expanded ID of 2 mm - 8 mm. For White color tubing, x represents expanded ID of 1mm - 50 mm.

yz - Represents any alpha and/or numeric combination for internal client code.

# - Tubing is considered to comply with the optional VW-1 flammability requirements only if it is so marked.

@ - Tubing limited to 0.7 to 15 mm internal diameters only. VW-1 rated for internal diameter sizes 6.50 - 15.00 mm only.

\$ - 125C rating restricted to 2.36 to 75.0 mm recovered ID only.

Marking: Company name or file number "E203950", catalog number, voltage rating, temperature rating in degrees C,

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inside diameter (before and after recovery), and date of manufacture shall be marked on tags attached to both ends of the tubing, on the shipping spool label or on the smallest unit container.

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