

# Data Sheet

(For Mechanical Use)

Product Type	WL Antenna
Model	ADVANTECH / A2
Part No. / YAGEO	CAN43139WLOT00621
Part No. / ADVANTECH	1750005980

**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

Antenna for WL Application.		Yageo Corporation SPD Datasheet Current Revision: <b>R01</b>		R01	Jan. 25,10
BY /	<b>Candy.Lin</b>	DATE /	<b>Jan. 25, 2010</b>		

## **Table of contents**

---

- 1. Specifications**
  - 1.1 Specifications**
  - 1.2 Antenna dimension / Cable length**
  - 1.3 Packing spec.**
  - 1.4 Antenna pictures**
- 2. Test methodology**
  - 2.1 Test equipment**
  - 2.2 Test setup**
    - 2.2.1 Frequency range**
    - 2.2.2 Antenna configuration**
    - 2.2.3 VSWR**
    - 2.2.4 Radiation pattern and gain**
- 3. Performance data**
  - 3.1 VSWR in the fixture (WL antenna)**
  - 3.2 Radiation pattern and gain**
    - 3.2.1 Low Frequency (2.40GHz~2.50GHz) (Main)**  
Middle Frequency (5.15GHz~5.35GHz)  
High Frequency (5.47GHz~5.85GHz)
    - 3.2.2 Average Gain Summary (WL Main antenna)**
- 4. Antenna drawing**
- 5. Reliability data for antenna patch**
- 6. Ordering information: Yageo ordering P/N code**
- 7. Revision control**
- 8. UL card**

## 1. Specifications

### 1.1 Specifications for antennas

<b>Frequency Range (GHz)</b>	<b>2.40 ~ 2.50 / 5.15~5.85</b>
<b>VSWR</b>	<b>2.5 : 1 max</b>
<b>Peak Gain</b>	<b>2.07 dBi for 2.4~2.5GHz band 3.35 dBi for 5.15~5.85GHz band</b>
<b>Radio Connector</b>	<b>Hirose U.FL, IPex MHF or Technova</b>
<b>Impedance</b>	<b>50Ω Nominal.</b>
<b>Cable Diameter</b>	<b>1.37 mm</b>
<b>Cable Color</b>	<b>Black for Main WL</b>
<b>Operating Temperature</b>	<b>-40~90°C</b>
<b>Maximum Power</b>	<b>1W</b>
<b>Polarization</b>	<b>Linear</b>
<b>Radiation Pattern</b>	<b>Omni-directional</b>

### 1.2 Antenna Dimension / Cable length

<b>Product</b>	<b>ADVANTECH / A2</b>
<b>WL Main antenna</b>	<b>24*6*0.4 mm /70.0 mm, Color Black</b>

### 1.3 Packing Spec.

<b>Product</b>	<b>For Example</b>
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**

### **2.1 Test equipment**

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

- A. Agilent 8753ET / 8719D Network Analyzer to measure the VSWR and input impedance.**
- B. Three-dimensional anechoic chamber to measure the gain**  
(Standard dipole and horn were 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**

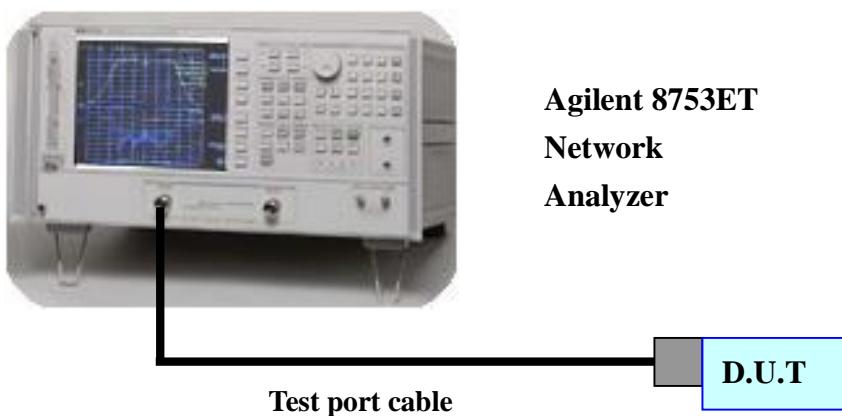
**2.40 ~ 2.50GHz**

#### **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 Agilent 8753ET / 8719D network analyzer. All the measurements are performed with the customer provided fixture. Figure 1 shows the schematic diagram for measuring VSWR.



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

#### 2.2.4 Radiation pattern and gain

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

#### 2D / 3D Anechoic chamber

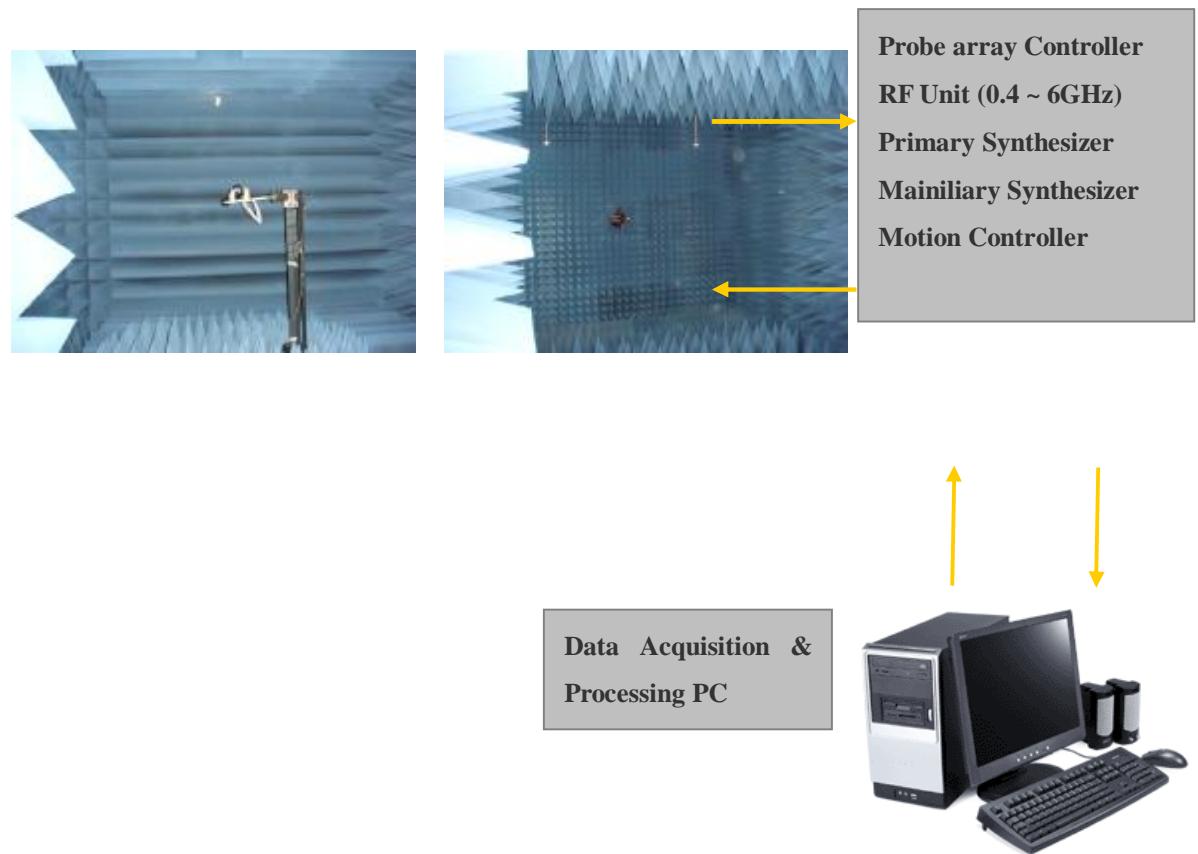


Figure 2. The schematic diagram for measuring radiation pattern and gain

### 3. Performance Data

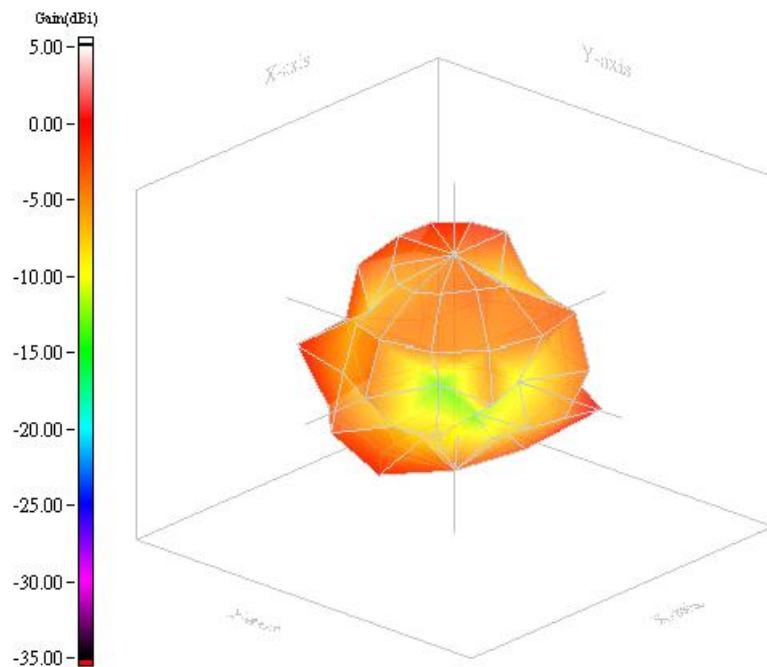
#### 3.1 VSWR in the fixture (WL-Main antenna)



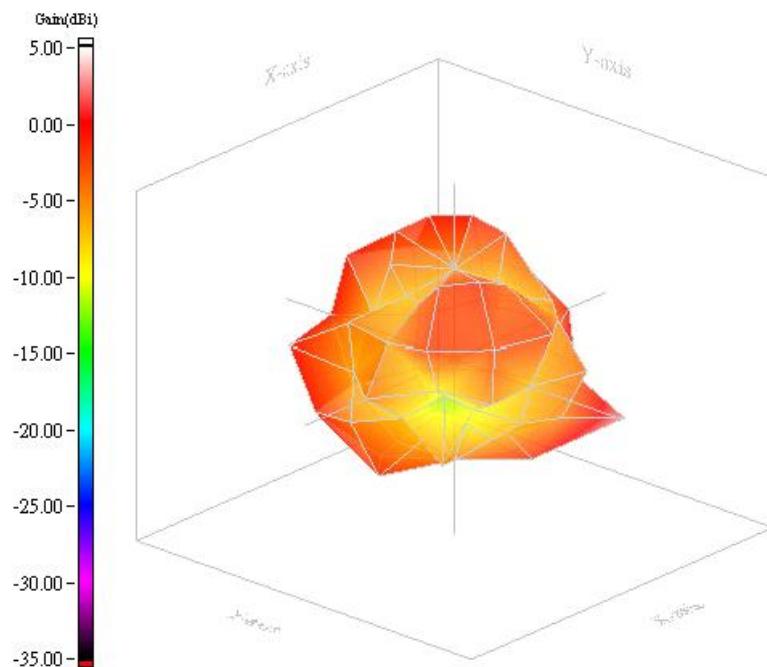
### 3.2 Radiation pattern and gain for 3D Data

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

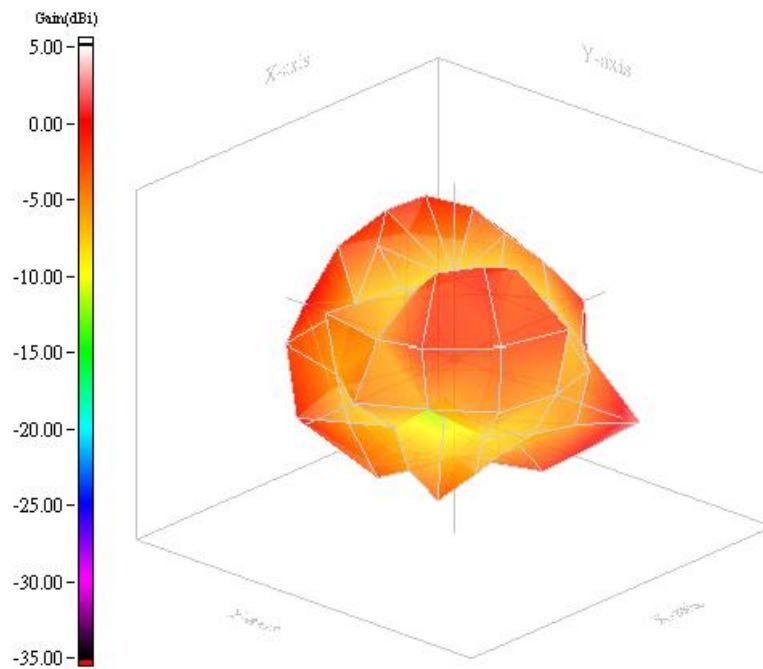
WL Main @ 2.40GHz



WL Main @ 2.45GHz

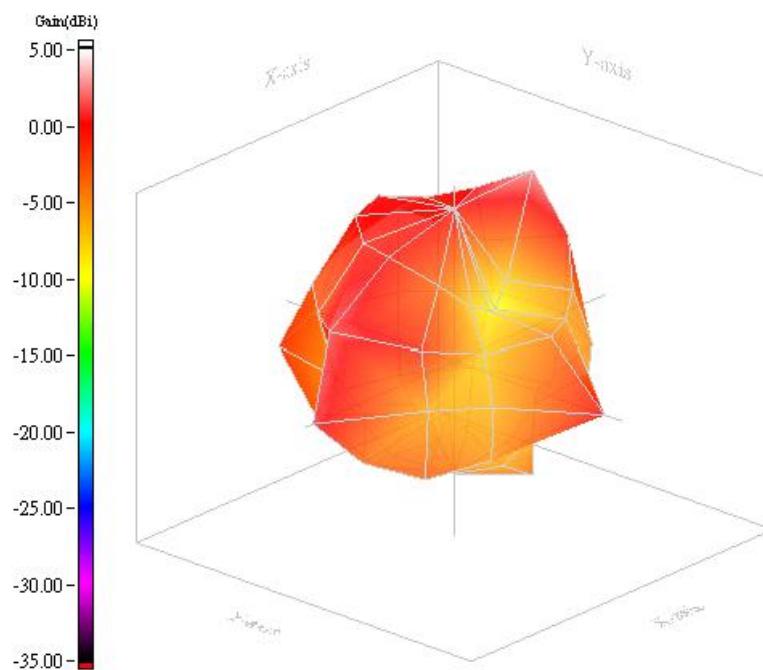


WL Main @ 2.50GHz

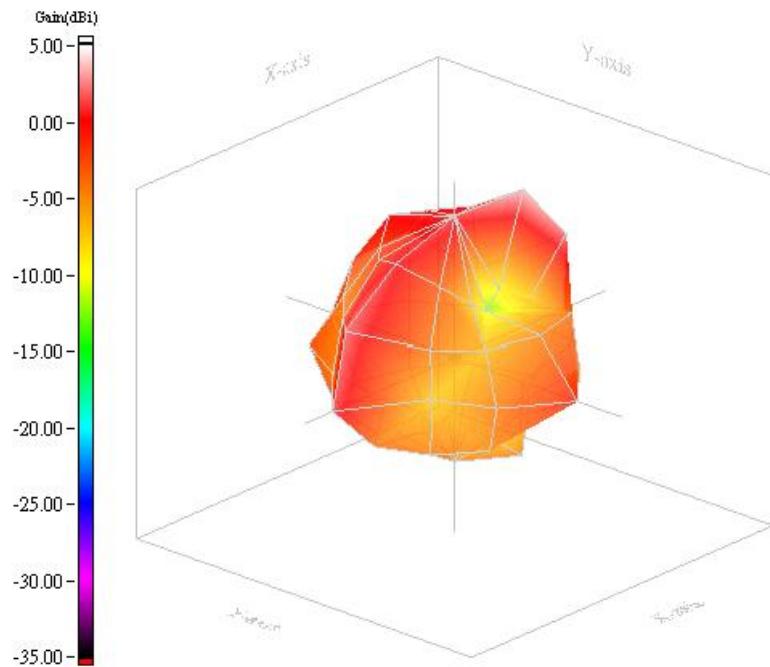


### 3.2.2 Middle Frequency (5.150GHz~5.35GHz) / Main Antenna

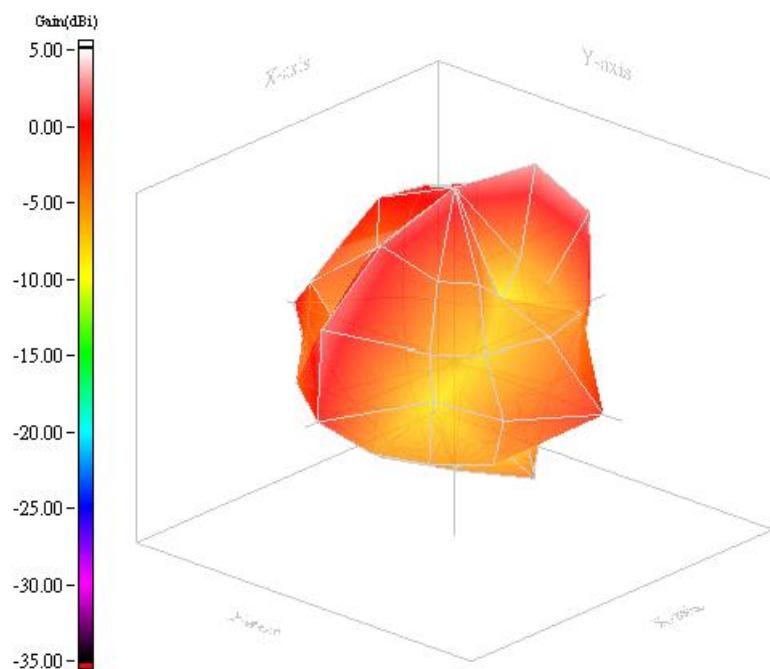
WL Main @ 5.15GHz



WL Main @ 5.25GHz

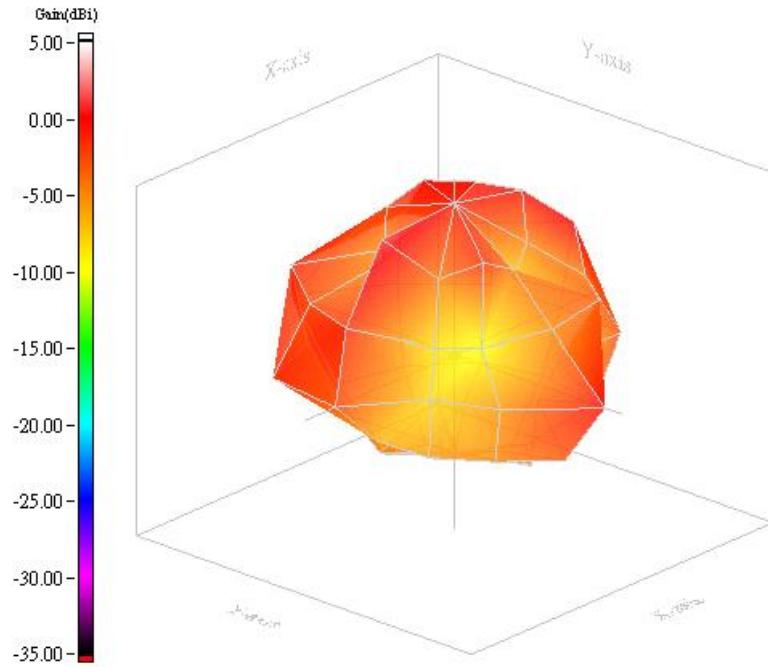


WL Main @ 5.35GHz

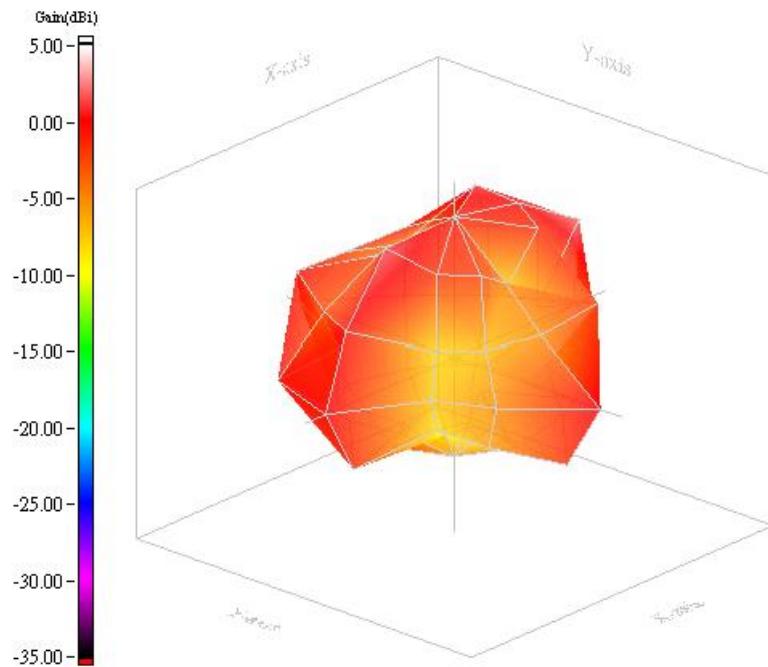


### 3.2.3 High Frequency (5.47GHz~5.85GHz) / Main Antenna

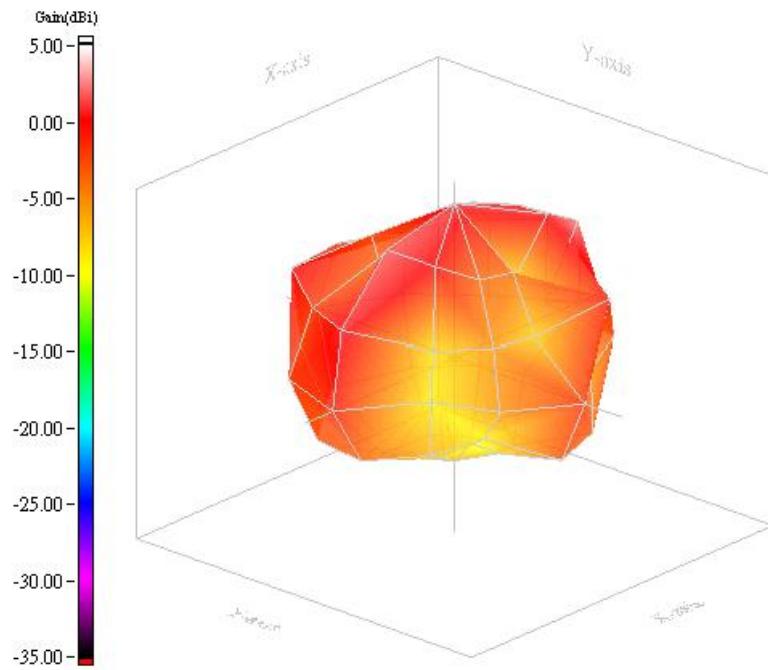
WL Main @ 5.47GHz



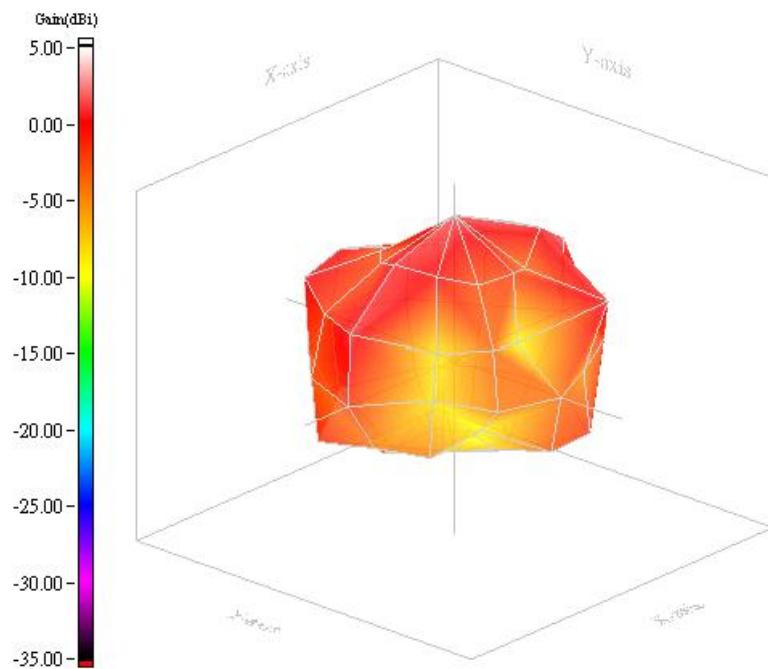
WL Main @ 5.60GHz



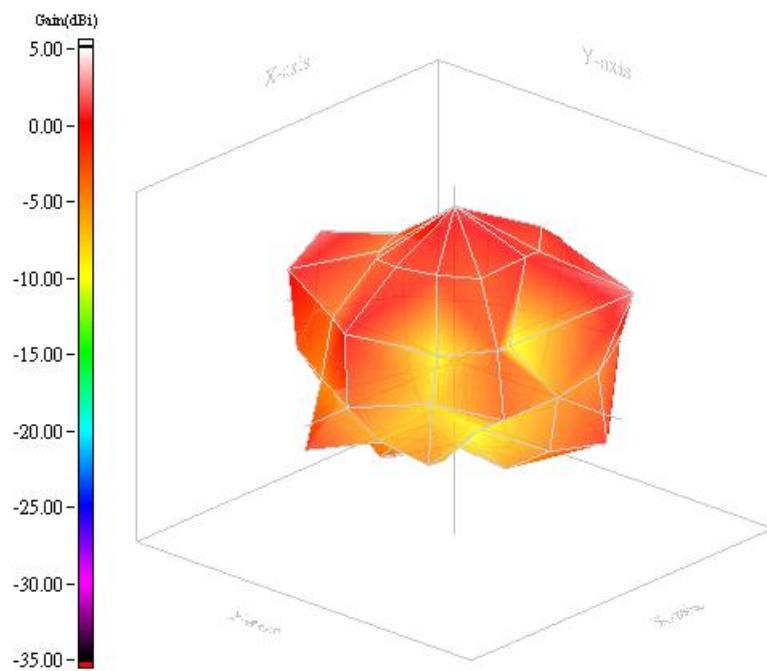
WL Main @ 5.725GHz



WL Main @ 5.785GHz



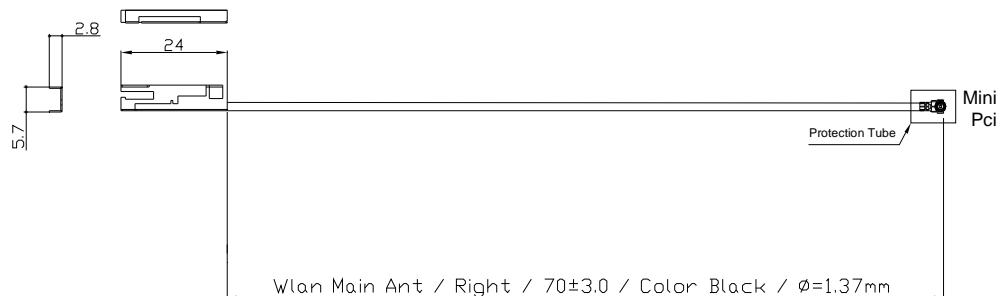
WL Main @ 5.85GHz



### 3.2.2 Average gain (dBi) summary

Frequency	WL Black Antenna Gain					
	Peak(dBi)		Average(dBi)			
	H-pol	V-pol	H-pol	V-pol	3D Gain	Efficiency%
2400 MHz	0.86	1.99	-5.97	-6.87	-3.39	45.87
2450 MHz	-0.15	2.07	-6.01	-5.91	-2.95	50.68
2500 MHz	-0.41	0.87	-6.57	-5.71	-3.11	48.87
5150 MHz	2.41	-0.15	-5.53	-6.46	-2.96	50.57
5250 MHz	3.35	0.64	-5.66	-7.08	-3.30	46.74
5350 MHz	2.62	1.09	-6.01	-7.11	-3.51	44.54
5470 MHz	-0.19	1.02	-6.29	-6.61	-3.43	45.34
5600 MHz	1.93	1.05	-5.81	-6.17	-2.98	50.39
5725 MHz	2.13	0.69	-5.66	-6.24	-2.93	50.95
5785 MHz	1.43	1.38	-5.31	-6.07	-2.67	54.12
5850 MHz	0.72	1.49	-5.61	-6.15	-2.86	51.73

## 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:

**CAN43 13    9    WL    OT    0062    1**

**D    C            Y            F            T            P            A**

**D. Antenna Division**

**CAN43= Antenna**

**C. Packing Type Code**

**13 = Carton**

**Y. Year Code**

**9 = 2009 Year**

**F. Antenna Function**

**WL = WLAN**

**T. Customer Name**

**OT = ADVANTECH**

**P. Project Number**

**0062= The quantity of antenna project**

**A. Antenna Number**

**1 = The quantity of antenna**

## **7. Revision Control**

<b>Revision</b>	<b>Date</b>	<b>Content</b>	<b>Remark</b>
R01	Jan. 25, 2010	New issued , Metal antenna	N/A.

## 8. UL Card

### Hirose Connector

UL IQ for Plastics Yellow Card

1/1 ←→ 3



Tuesday, July 25, 2006

E213445

QMFZ2 Component - Plastics

WINTECH POLYMER LTD  
18-1 KONAN 2-CHOME MINATO-KU TOKYO 108-8280 JP

Material Designation: XFR 4840

Product Description: Polybutylene Terephthalate (PBT), designated "Duranex" furnished as pellets.

Color	Min. Thick. (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str	IEC GWIT	IEC GWFI
ALL	0.75	V-0	3	0	75	75	75	-	-
	1.5	V-0	2	0	75	75	75	-	-
	3.0	V-0	2	0	75	75	75	-	-

CTI: 0 IEC CTI (V): - HVTR: 0 D495: 5 IEC Ball Pressure (°C): -

Dielectric Strength (kV/mm): 17 Volume Resistivity (10<sup>12</sup>ohm-cm): 16 Dimensional Stability(%): -

ISO Tensile Strength (MPa): - ISO Flexural Strength (MPa): - ISO Heat Deflection (°C): -

ISO Tensile Impact (kJ/m<sup>2</sup>): - ISO Izod Impact (kJ/m<sup>2</sup>): - ISO Charpy Impact (kJ/m<sup>2</sup>): -

Report Date: 7/24/2006

Underwriters Laboratories Inc®

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 UL.

Technova Connector

Plastics - Component

GE PLASTICS JAPAN LTD  
CUSTOMER SERVICE & LOGISTICS  
2-2 KINUGAOKA  
MOKA-SHI  
TOCHIGI-KEN 321-4392, JAPAN

E45587

									H	D	
		Min.		H	H	R	T	I	V	4	C
		Thk	Flame	W	A	Elec	Mech		T	9	T
Material Dsg	Color	mm	Class	I	I		Imp	Str	R	5	I
Polybutylene Terephthalate (PBT), glass reinforced, designated "Valox" furnished as pellets.											
DR48, DR48M	ALL	0.71	V-0	3	0	120	120	140	—	—	—
		1.5	V-0	3	0	120	120	140	—	—	—
		3.0	V-0, 5VA	3	0	120	120	140	4	7	3
		6.0	V-0, 5VA	2	0	120	120	140	—	—	—



ONLINE CERTIFICATIONS DIRECTORY

QMFZ2.GuideInfo  
Plastics - Component

[View Listings](#)

[Page Bottom](#)

**Plastics - Component**

The materials covered under this category are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. THE FINAL ACCEPTANCE OF THE COMPONENT IS DEPENDENT UPON ITS INSTALLATION AND USE IN EQUIPMENT SUBMITTED TO UNDERWRITERS LABORATORIES INC.

**GENERAL**

This category covers materials that have been tested in accordance with established methods to define their properties in order to facilitate investigation of their use in end-use product applications. The tests may include the determination of material flammability (burning characteristics), ignition characteristics from various thermal and electrical sources, electrical tracking and other electrical characteristics, physical and mechanical characteristics, and analytical tests. In addition, the effect of long-term exposure to elevated temperature (air-oven aging), water, ultraviolet light, cold, etc., on property retention may be investigated. Levels of performance characteristics required for a particular end-use product application are intended to be in accordance with the requirements of the end-use product standard. Due to space limitations, only a limited number of property values may be presented in the individual Recognitions. Additional properties may be found in the [UL IQ™ for Plastics database](#) at [www.ul.com](http://www.ul.com), or in the individual Reports.

In those cases where the materials have the same performance characteristics, with the exception of weathering resistance, they are tabulated together as a group with each material designation separated by a comma. The individual Recognitions may include alternate designations as well as materials that are basically similar in composition but differ by some minor variation, such as molecular weight, lubricants, colorants, etc.

**Colors**

The colors noted below are as pigmented by the material manufacturer; unless otherwise indicated, the property values are for the unpigmented (Natural color) material. Refer to Flame-retardant and/or Color Concentrates (QMFZ2) and [ANSI/UL 746D](#), "Polymeric Materials - Fabricated Parts," for limitations on the use of concentrates by the part molder or processor. The following abbreviations may be used in the individual Recognitions to represent the material color:

Abbreviation	Color
AL	Aluminum
ALL -AO -AT	Any color - Any color (opaque only) - Any color (transparent only)
AM	Amber
BG	Beige
BK	Black
BL	Blue
BN	Brown
BZ	Bronze
CL	Clear
GD	Gold
GN	Green
GY	Gray
IV	Ivory
NC	Natural (No pigmentation)
OL	Olive
OR	Orange
PK	Pink
RD	Red
SM	Smoke
TN	Tan
VT	Violet

<http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?&name=Q...> 2008/5/30

WT	White
YL	Yellow

**Flammability**

Materials may be classified based on burning tests conducted in accordance with **ANSI/UL 94**, "Test for Flammability of Plastic Materials for Parts in Devices and Appliances," **ANSI/UL 1694**, "Tests for Flammability of Small Polymeric Component Materials," and **ANSI/UL 723**, "Test for Surface Burning Characteristics of Building Materials."

ANSI/UL 94 small-scale test data does not pertain to building materials, furnishings and related contents. ANSI/UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-use product devices and appliances, where the acceptability of the combination is determined by UL.

	TEST NAME (per ANSI/UL 94)					
	Horizontal Burning Test	20 mm Vertical Burning Test	Thin Material Vertical Burning Test	Horizontal Burning Foamed Material Test		500 Watt (125 mm) Vertical Test
Flame Rating Hierarchy	—	V-0	VTM-0	—	More Severe	SVA
	—	V-1	VTM-1	HF-1	↑	SVB
	—	V-2	VTM-2	HF-2	↑	
	HB	—	—	HBF	Less Severe	

**Thermal Endurance**

The temperature below which a class of critical property will not be unacceptably compromised through chemical thermal degradation, over the reasonable life of an electrical product (relative to a reference material having a confirmed, acceptable corresponding performance) is defined as the Relative Thermal Index (RTI). More than one RTI may be appropriate for a given material depending on the property requirements for a given application. In certain cases, higher temperatures are permitted if so specified by the end-use product standard.

**RTI Elec** — Electrical RTI, associated with critical insulating properties.

**RTI Mech Imp** — Mechanical Impact RTI, associated with critical impact resistance, toughness, elongation and flexibility properties.

**RTI Mech Str** — Mechanical Strength (Mechanical without Impact) RTI, associated with critical mechanical strength and structural integrity where impact resistance, resilience and flexibility may not be essential.

**Resistance to Ignition and Tracking Properties**

Performance may be investigated with respect to electrical track resistance, ability to resist ignition from electrical sources, and other electrical properties. In order to avoid an excessive level of implied precision and bias, material performances for several tests are recorded as Performance Level Categories (PLC), based on the mean test results (rather than recording the exact numerical results), as indicated in the table following the test description.

**Hot-Wire Ignition (HWI; ASTM D3874, IEC 60695-2-20 )** — Performance is expressed as the mean number of seconds needed to either ignite standard specimens or to burn through the specimens without ignition.

HWI Range Mean Ignition Time (in sec)	Assigned PLC
120 and longer	0
60 through 119	1
30 through 59	2
15 through 29	3
7 through 14	4
Less than 7	5

**High- Current Arc Ignition (HAI; ANSI/UL 746A )** — Performance is expressed as the number of arc rupture exposures (standardized as to electrode type and shape and electric circuit) that are necessary to ignite a material when they are applied at a standard rate on the surface of the material.

HAI Range Mean Number of Arcs to Cause Ignition	Assigned PLC
—	—

120 and greater	0
60 through 119	1
30 through 59	2
15 through 29	3
Less than 15	4

**High-Voltage Arc Tracking Rate (HVTR; ANSI/UL 746A )** — Denoted as the rate, in mm/min, that a tracking path can be produced on the surface of the material under standardized test conditions. A notation is made if ignition on the material takes place. The results of testing the nominal 3 mm thickness are considered representative of the material's performance in any thickness.

HVTR Range (in mm/min)	Assigned PLC
0 through 10	0
10.1 through 25.4	1
25.5 through 80	2
80.1 through 150	3
Greater than 150	4

**High-Voltage, Low-Current Arc Resistance (D495; ASTM D495 )** — Expressed as the number of seconds that a material resists the formation of a surface conducting path when subjected to an intermittently occurring arc of high voltage, low current characteristics. The results of testing the nominal 3 mm thickness are considered representative of the material's performance in any thickness.

D495 Range Mean Time of Arc Resistance (in sec)	Assigned PLC
420 and longer	0
360 through 419	1
300 through 359	2
240 through 299	3
180 through 239	4
120 through 179	5
60 through 119	6
Less than 60	7

**Comparative Tracking Index (CTI; ASTM D3638 )** — Expressed as that voltage which causes tracking after 50 drops of 0.1 percent ammonium chloride solution have fallen on the material. The results of testing the nominal 3 mm thickness are considered representative of the material's performance in any thickness.

CTI Range Tracking Index (in volts)	Assigned PLC
600 and greater	0
400 through 599	1
250 through 399	2
175 through 249	3
100 through 174	4
Less than 100	5

The above characteristics and dielectric strength, volume resistivity and other electrical and mechanical properties may be determined by means of the applicable ASTM and/or UL specification in ANSI/UL 746A, "Polymeric Materials - Short Term Property Evaluations."

In addition to minimum electrical and ignition test levels, materials that are used in applications involving support or contact with current-carrying parts are also required to display a minimum stability (heat distortion, moisture resistance, dimensional stability and mold stress) performance level, as described in ANSI/UL 746C, "Polymeric Materials - Use in Electrical Equipment Evaluations."

**CONDITIONS OF ACCEPTABILITY**

<http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?&name=Q...> 2008/5/30

Unless specified otherwise in the individual Recognitions, consideration is to be given to the following Conditions of Acceptability when these components are employed in the end-use equipment:

1. **Material traceability** for parts covered under Fabricated Parts (QMMY2).
2. **Material identification** for a device employing parts molded of these materials should specify the parts' wall thickness, color, material identification, and traceability.
3. Materials must meet applicable requirements concerning the **molding and fabricating** of finished parts as described in ANSI/UL 746D, "Polymeric Materials - Fabricated Parts." This includes, but is not limited to, the restricted use of regrind thermoplastic material to amounts less than 25% unless specified in the individual Recognitions.
4. Unless otherwise indicated, **suitability for use** when exposed to weathering, oils, soaps, chemicals, x-rays, and the like has not been determined.
5. **Investigation of parts for other properties** in accordance with the applicable UL end-use product standard and/or requirements outlined in ANSI/UL 746C.

Additional Conditions of Acceptability may be found in the individual Recognition Report available from the manufacturer.

#### GENERIC MATERIAL SYMBOLS

The generic material symbols are based upon the terminology developed in the International Organization for Standardization publications ISO 1043, "Plastics - Symbols and Abbreviated Terms," and ISO 1629, "Rubber and Latices - Nomenclature."

#### FOAMED MATERIALS

Materials that have been foamed with the introduction of a chemical blowing agent or inert gas may have significantly different properties than the unfoamed or solid material form; therefore, ratings that are established for solid (unfoamed) material do not automatically apply to the foamed version of that same material.

#### MATERIALS FOR USE IN SPECIAL ENVIRONMENTS

Investigation of materials for specific end-use product applications where requirements exist for the retention of properties after exposure to certain critical operating and/or environmental conditions may be indicated in the individual Recognitions.

#### COLUMN HEADING ABBREVIATIONS

The following abbreviations may be used in the column headings in the individual Recognitions:

Abbreviation	Term
Flame Class	ANSI/UL 94 Flammability Classification
Mtl Dsg	Material Designation
Col	Color
Min Thk	Minimum Thickness
Thk Rg	Thickness Range
Den Range g/cc	Density Range, g/cc
Elec	Electrical
RP	Radiant Panel
RTI	Relative Temperature Index
HWI	Hot-wire Ignition
HAI	High-current-arc Ignition
HVTR	High-voltage-arc Tracking Rate

D495	Arc Resistance
CTI	Comparative Tracking Index
Mech	Mechanical
Tnsl	Tensile
Elong	Elongation
Str	Strength
Imp	Impact

**RELATED PRODUCTS**

See the following:

Polymeric Materials - Filament-wound Tubing, Industrial Laminates, Vulcanized Fiber, and Materials for Use in Fabricating Recognized Printed Wiring Boards ([QMTS2](#))

Coatings for Use on Recognized Printed Wiring Boards ([QM1U2](#))

Metalized Parts ([QMBX2](#))

Supplier Components for Use in the Fabrication of Metalized Parts ([QMSS2](#))

Systems, Electrical Insulation ([QBY2](#))

Polymeric Adhesive Systems, Electrical Equipment ([QODW2](#))

Flame-retardant and/or Color Concentrates ([QMO52](#))

Mold-release Lubricants ([QMSX2](#))

Last Updated on 2004-08-03

[Questions?](#)

[Notice of Disclaimer](#)

[Page Top](#)

[Copyright © 2008 Underwriters Laboratories Inc.®](#)

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Listed and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Designs and/or Listings (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from Underwriters Laboratories Inc." must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "Copyright © 2008 Underwriters Laboratories Inc.®"

An independent organization working for a safer world with integrity, precision and knowledge.



## Nissei Cable (10607)

AVLV2.E56198 - Appliance Wiring Material - Component

第 1 頁，共 2 頁



ONLINE CERTIFICATIONS DIRECTORY

### AVLV2.E56198 Appliance Wiring Material - Component

Page Bottom

### Appliance Wiring Material - Component

See General Information for Appliance Wiring Material - Component

**NISSEI ELECTRIC CO LTD**  
RYUYO FACTORY  
206 MATSUMOTO  
IWATA-SHI, SHIZUOKA 430-0206 JAPAN

E56198

Table of Recognized Styles							
<b>Single-conductor, thermoplastic insulation.</b>							
1164	1333	1584	1726	10109	10510	10652	11066
1180	1354	1586	1727	10231	10516	10710	11067
1198	1371	1591	1827	10248	10584	10714	11068
1199	1508	1592	1828	10315	10589	10735	11069
1212	1512	1609	1829	10344	10607	10736	11102
1213	1513	1610	1842	10396	10608	11020	11103
1226	1516	1637	1943	10443	10617	11021	11126
1227	1517	1671	10048	10485	10653	11022	11127
1330	1523	1709	10050	10504	10654	11023	11128
1331	1538	1710	10086	10508	10655	11024	11129
1332	1577	1723	10107	10509	10656	11065	
<b>Multiple-conductor, thermoplastic insulation.</b>							
2095	2384	2516	2598	2658	2854	2994	20901
2096	2385	2517	2614	2704	2826	20602	20936
2097	2386	2522	2626	2709	2934	20207	21075
2098	2387	2549	2630	2725	2935	20233	21111
2099	2388	2550	2631	2726	2936	20234	21112
2100	2448	2570	2637	2779	2937	20276	21113
2101	2462	2571	2653	2785	2938	20379	21242
2102	2463	2574	2654	2786	2961	20535	21243
2103	2464	2576	2655	2789	2969	20708	21356
2343	2490	2584	2656	2835	2990	20897	
2344	2493	2596	2660	2841	2991	20898	
2345	2501	2587	2661	2842	2992	20899	
2346	2502	2589	2662	2843	2993	20900	

**Single-conductor, thermoset insulation.**

3068	3074	3126	3138	3243	3323	3543	3733
3069	3075	3132	3139	3301	3362	3723	3734
3070	3122	3133	3172	3305	3488	3724	3776
3071	3125	3135	3239	3318	3503	3725	

**Single and multiple-conductor specialty items.**

5048	5187	5224	5226	5228
5140	5223	5225	5227	5229

Marking: Company name, voltage rating, temperature rating, conductor size, conductor material if other than copper, and use.  
Last Updated on 2008-10-25

Questions?

[Notice of Disclaimer](#)

[Page Top](#)

[Copyright 2009 Underwriters Laboratories Inc.®](#)

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Listed and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Designs and/or Listings (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from Underwriters Laboratories Inc." must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "Copyright © 2009 Underwriters Laboratories Inc.®"

An independent organization working for a safer world with integrity, precision and knowledge.



**PGGU2.MH15431**  
**Marking and Labeling System Materials - Component**

[Page Bottom](#)

[Print-friendly version](#)

[Questions?](#)

[Previous Page](#)

**Marking and Labeling System Materials - Component**

**Guide Information**

**SONY CHEMICALS CORP**  
KANUMA FACTORY  
18 SATSUKI-CHO  
KANUMA-SHI  
TOCHIGI-KEN 322-8501, JAPAN

MH15431

**Pressure sensitive laminating adhesives:** NP203, NP203W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

NP303, NP303W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

G4000, G9303S, T3500, T3500S, T3500SW, T3500W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

T4000, T4000W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

T4000B, T4000BW. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

T4500B, T4500BW. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F).

Suitable where exposed indoors to high humidity and occasional exposure to water.

T4700M. For bonding aluminum (thickness 0.002 to 0.032 in) to aluminum, and galvanized steel, max temperature 150 C (302 F) min temperature -40 C (-40 F); Acrylonitrile Butadiene Styrene (ABS) and Polypropylene plastics; max temperature 80 C (176 F) min temperature -40 C (-40 F); Polystyrene plastics; max temperature 60 C (140 F) min temperature -40 C (-40 F). Suitable where exposed indoors to high humidity or occasional exposure to water.

G90XX\$\$. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

T4700M. For bonding aluminum (thickness 0.002 to 0.032 in.) to aluminum, and galvanized steel, max temperature 150 C (302 F) min temperature -40 C (-40 F); Acrylonitrile Buatdiene Styrene (ABS) and Polypropylene plastics; maximum temperature 80 C (176 F), minimum temperature -40 (-40 F); polystyrene plastics, maximum temperature 60 C (140 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity or occasional exposure to water.

T4410, T4410W, T4411, T4411W, T4900, T4900W. For bonding aluminum (thickness 0.002 to 0.032 in.) to aluminum, stainless steel, galvanized steel, alkyd enamel and porcelain, maximum temperature 150 C (302 F), minimum temperature -40 C (-40 F); polycarbonate, maximum temperature 100 C (212 F), minimum temperature -40 C (-40 F); polyphenylene oxide, nylon and ABS plastic, maximum temperature 80 C (176 F), minimum temperature 40 C (-40 F). Suitable where exposed indoors to high humidity or occasional exposure to water. Also suitable where exposed outdoors, affixed to all the surfaces mentioned above except aluminum, stainless steel, polycarbonate, polyphenylene oxide and nylon.

T4720. For bonding aluminum (thickness 0.002-0.032 inch) to aluminum and galvanized steel, maximum temperature 150 C (302 F), minimum temperature -40 C (-40 F); ABS plastic, maximum temperature 80 C (176 F), minimum temperature -40 C (-40 F) and polystyrene, maximum temperature 60 C (140 F), minimum temperature -40 C (-40 F). Suitable for indoor use where exposed to high humidity or occasional exposure to water.

T4720. For bonding aluminum (thickness 0.032 inch) to polypropylene, maximum temperature 80 C (176 F). Suitable for indoor use where exposed to high humidity or occasional exposure to water.

G91XX\$\$, for bonding aluminum thickness 0.008 thru 0.020 in., acrylic 0.020 thru 0.079 in. and polycarbonate 0.020 thru 0.079 in. to ABS plastic, maximum temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable for indoor use where exposed to high humidity or occasional exposure to water.

"G99XX\$". For bonding aluminum face stock 0.007 inch - 0.020 inch thick, polycarbonate face stock 0.020 inch - 0.079 inch thick and acrylic face stock 0.020 inch - 0.079 inch thick to ABS plastic, maximum temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable for indoor use where exposed to high humidity or occasional exposure to water.

Note:

\$\$- May be replaced by alpha characters denoting release liner type.

XX-Replaced by digits denoting product thickness.

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

[Page Top](#)

[Notice of Disclaimer](#)

[Questions?](#)

[Previous Page](#)

[UL Listed and Classified Products](#)

[UL Recognized Components](#)

[Products Certified for Canada](#)

This page and all contents are Copyright © 2004 by Underwriters Laboratories Inc. ®

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Listed and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Designs and/or Listings (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from Underwriters Laboratories Inc." must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "Copyright © 2004 Underwriters Laboratories Inc. ®"