

# APPROVAL SHEET

MULTILAYER CERAMIC ANTENNA

**RFANT BROADBAND Series**

2.4 GHz ISM Band Working Frequency

**RFANT7635110A1T**

\*Contents in this sheet are subject to change without prior notice.

**REVISION HISTORY**

Rev	P/N	Description	Date
V01	RFANT7635110A1T	First Version	2004-07-13
V06	RFANT7635110A1T	Increase Revision History as Page-2 Update the "±" Mark.	2004-12-08

## FEATURES

- ☐ Surface Mounted Devices with a small dimension of  $7.6 \times 3.5 \times 1.1 \text{ mm}^3$  meet future miniaturization trend.
- ☐ 380MHz broad bandwidth design makes less influence, less frequency shifting due to outside environmental deviation.
- ☐ 70% small footprint compared to normal band design (140MHz).
- ☐ Embedded and LTCC (Low Temperature Co-fired Ceramic) technology is able to future integrate with system design as well as beautifying the housing of final product.
- ☐ High Stability in Temperature / Humidity Change
- ☐ Free Impedance Matching

## APPLICATIONS

- ☐ Bluetooth
- ☐ Wireless LAN
- ☐ HormRF
- ☐ ISM band 2.4GHz wireless applications

## DESCRIPTION

Walsin Technology Corporation develops a new ceramic embedded antenna specified for 2.4 GHz ISM Band application, as shown in below "CONSTRUCTION". Both of Wireless LAN IEEE 802.11b and Bluetooth™ typically located on this unlicensed frequency band which range covers from 2.4GHz to 2.4835GHz. To fulfil the friendly usage for antenna, this antenna has been designed to a typical 400MHz bandwidth through Walsin's advanced LTCC (Low Temperature Co-fired Ceramic) technology and superior product design via 3D EM Simulation Skill.

This antenna has a rectangular ceramic body with a tiny dimension of  $7.6 \times 3.5 \times 1.1 \text{ mm}^3$  meet the future SMT automation and miniaturization requirements on modern portable devices.

## CONSTRUCTION

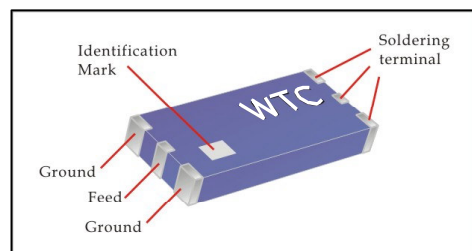
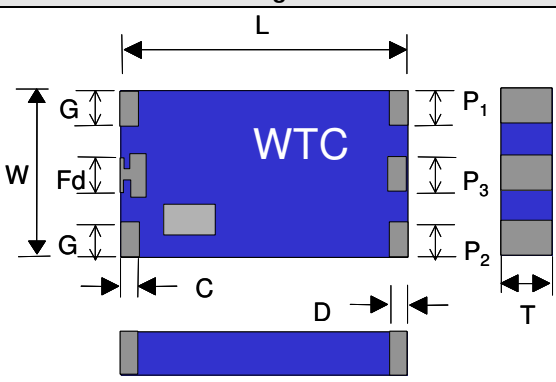


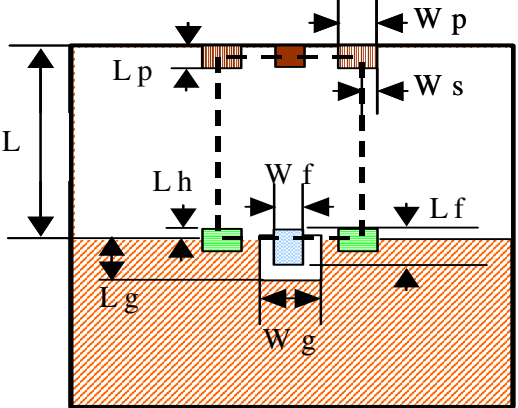




Fig 1. Outline of 2.4GHz Chip Antenna

## DIMENSIONS

Figure	Dimension		Port definition
	L	$7.60 \pm 0.30 \text{ mm}$	-
	W	$3.50 \pm 0.20 \text{ mm}$	-
	T	$1.10 \pm 0.10 \text{ mm}$	-
	Fd	$0.50 \pm 0.20 \text{ mm}$	Feed termination
	G	$0.80 \pm 0.20 \text{ mm}$	Ground termination
	C	$0.50 \pm 0.20 \text{ mm}$	
	D	$0.50 \pm 0.20 \text{ mm}$	
	P <sub>1</sub>	$0.80 \pm 0.20 \text{ mm}$	Solder termination
	P <sub>2</sub>	$0.80 \pm 0.20 \text{ mm}$	Solder termination
	P <sub>3</sub>	$0.50 \pm 0.10 \text{ mm}$	Solder termination

**MARKING:** Upon customer requested, max. 5-digit code is allowed.

## SOLDER LAND PATTERN DESIGN

Figure	Symbol	Dimension
 <p>The diagram shows a top-down view of a PCB layout. It includes a central blue square (Pad connected to 50Ω Transmission Line) surrounded by a green square (Pad connected to Ground). This is further enclosed by an orange hatched area (Ground). Above the ground area are two brown rectangles (Soldering Pads). Dimensions are indicated with arrows: L (total length), Lp (pad length), Wp (pad width), Lh (height of the central pad), Wf (width of the central pad), Lf (length of the ground pad), Lg (length of the ground area), Wg (width of the ground area), and Ws (width of the soldering pad).</p> <p>  Soldering Pad   Ground   Pad connected to Ground   Pad connected to 50Ω Transmission Line </p>	L	$8.10 \pm 0.10 \text{ mm}$
	Lp	$1.00 \pm 0.10 \text{ mm}$
	Wp	$1.20 \pm 0.10 \text{ mm}$
	Lf	$1.50 \pm 0.10 \text{ mm}$
	Wf	$0.80 \pm 0.10 \text{ mm}$
	Lg	$1.50 \pm 0.10 \text{ mm}$
	Wg	$1.50 \pm 0.10 \text{ mm}$
	Ws	$0.40 \pm 0.10 \text{ mm}$
	Lh	$0.50 \pm 0.10 \text{ mm}$

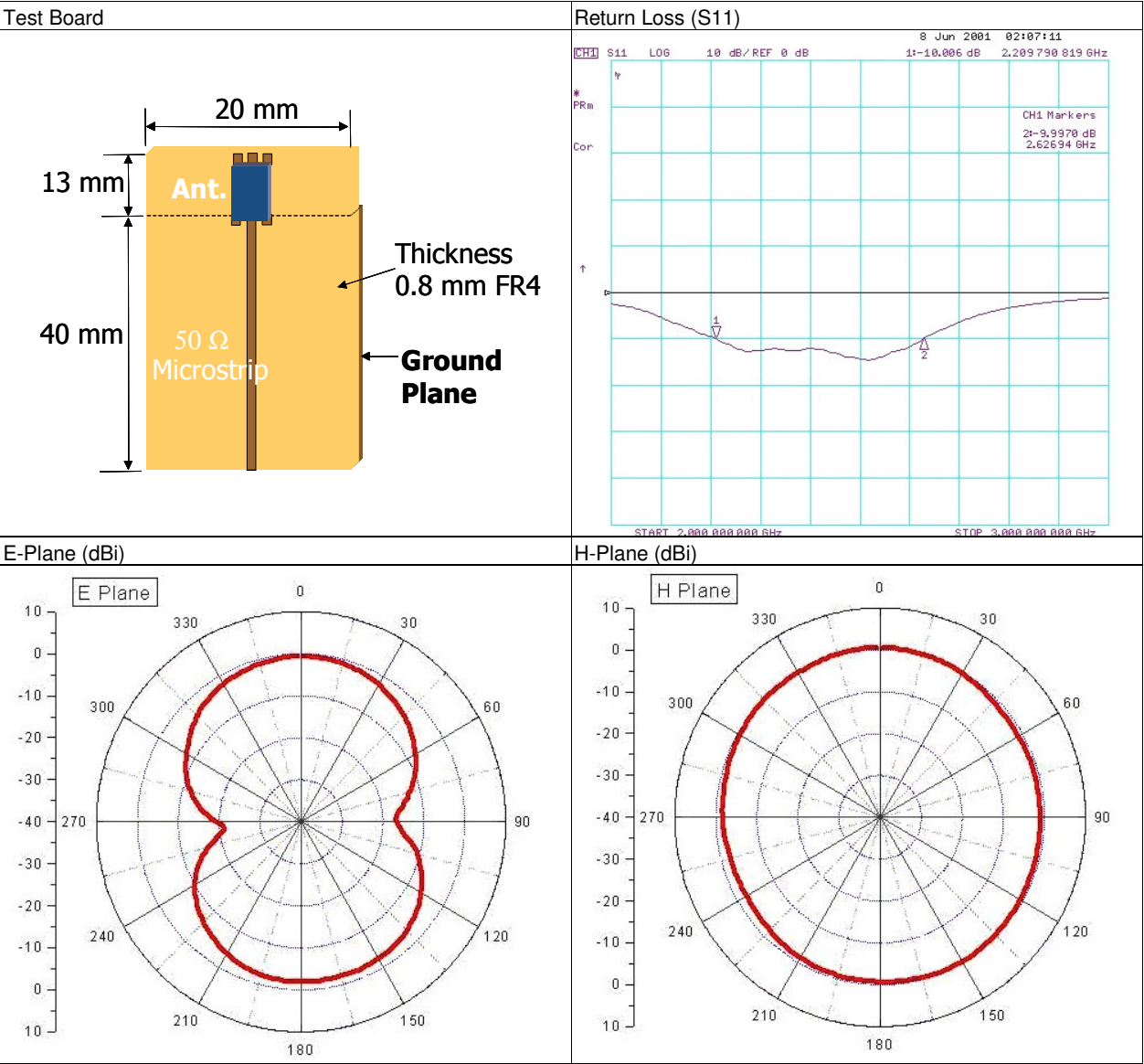
## ELECTRICAL CHARACTERISTICS

Item	Specification
Central frequency	2.450 GHz (Note-1)
Bandwidth	380 MHz (Typical value)
Gain	0 ~ 2 dBi
VSWR	2 max.
Polarization	Linear
Azimuth Beamwidth	Omni-directional
Impedance	50Ω
Rated Power (max.)	5 Watts
Maximum Input Power	10 Watts for 5 minutes
Operation Temperature	-40° C ~ +85° C

Note-1. Central Frequency should be defined after customers' application approval.

RADIATION PATTERN

Radiation Pattern and Gain were dependent on measurement board design. Walsin's LTCC chip antenna is an electrically small antenna (size smaller than  $1/10\lambda$ ). The specification of RFANT7635110A1x series chip antenna was measured based on the PCB size and installation position as shown in the below figure



The typical tuning range of Walsin's chip antenna is about  $\pm 150\text{MHz}$ . The performance of embedded ceramic antenna is sensitive influenced by customer's ground area, PC board size, thickness, material, mechanical design and the material of housing for end product.

WTC engineers have significant expertise on embedded antenna designs and applications. We can work closely with you to ensure the requirements are met, and optimise the WTC's antenna performance when installing on your application.

**RELIABILITY TEST****■ Mechanical performance**

Test item	Test condition / Test method	Specification
Solderability	Solder temp. : $235 \pm 5^{\circ}\text{C}$ Immersion time: $2 \pm 1$ sec Solder: SN63	95% min. coverage of all metallized area
Resistance to soldering heat	Solder: Sn63 Preheating temperature: $150 \pm 10^{\circ}\text{C}$ Solder Temperature: $260 \pm 5^{\circ}\text{C}$ Immersion time: $10 \pm 1$ sec Measurement to be made after keeping at room temp. for $24 \pm 2$ hrs.	No mechanical damage. Ceramic surface shall not be exposed in the middle of the termination or on the terminated product edge by leaching.
Drop test	Height : 75 cm Direction : 3 directions Times : 3 times for each direction.	No mechanical damage. Samples shall satisfy electrical specification after test..

**■ Environmental characteristics**

Test item	Test condition / Test method	Specification
Humidity Resistance	Humidity: 90% to 95% R.H. Temperature: $40 \pm 2^{\circ}\text{C}$ Time: $500 \pm 24$ hours. Measurement: After placing for 24 hours Minimum.	No mechanical damage. Samples shall satisfy electrical specification after test.
Temperature cycle	1. $30 \pm 3$ minutes at $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , 2. 10~15 minutes at room temperature, 3. $30 \pm 3$ minutes at $+85^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , 4. 10~15 minutes at room temperature, Total 100 continuous cycles Measurement after placing for $48 \pm 2$ hrs min.	No mechanical damage. Samples shall satisfy electrical specification after test.
High temperature	Temperature: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Test duration: 24 hours Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours.	No mechanical damage. Samples shall satisfy electrical specification after test.
Low temperature	Temperature: $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Test duration: 24 hours Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours.	No mechanical damage. Samples shall satisfy electrical specification after test.

**SOLDERING CONDITION**

Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 2

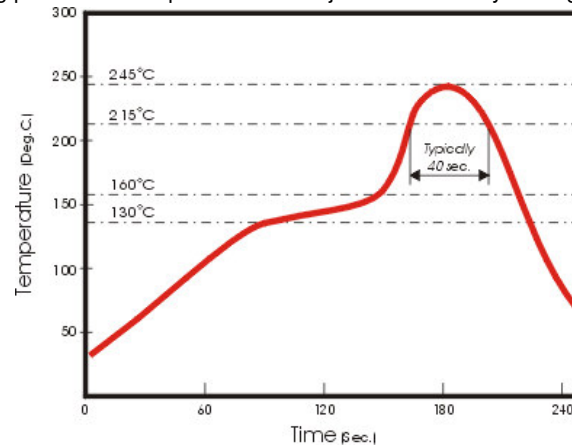
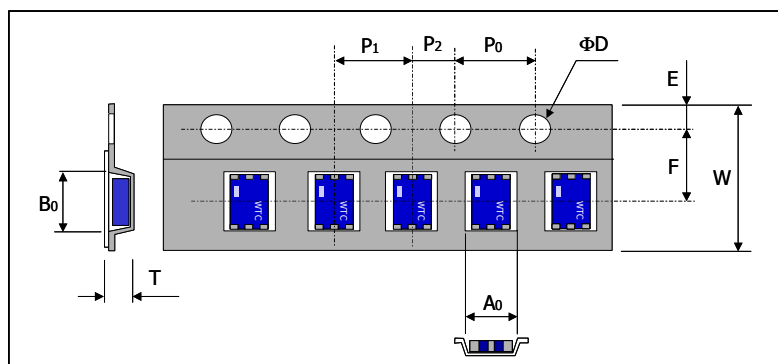


Fig 2. Infrared soldering profile

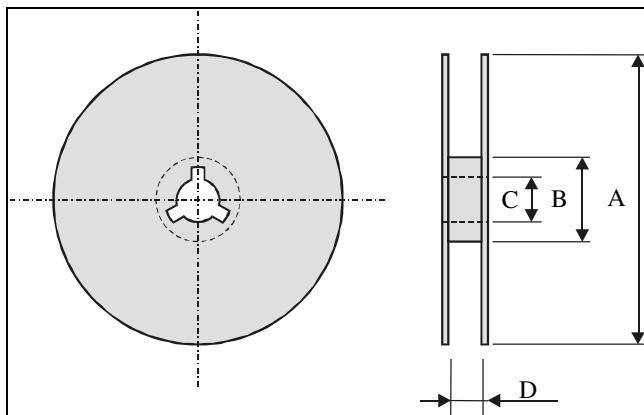
**ORDERING CODE**

RF	ANT	763511	0	A	1	T
<b>Walsin</b> RF device	<b>Product code</b>  ANT : Antenna	<b>Dimension code</b>  Per 2 digits of Length, Width, Thickness :  e.g. : 763511 = Length 76, Width 35, Thickness 11	<b>Unit of dimension</b>  0 : 0.1 mm 1 : 1.0 mm	<b>Application</b>  A : 2.4GHZ ISM Band B : GSM 900/1800 Dual Band C : GSM 900 D : GSM 1800 E : GPS F : W-CDMA G : PHS	<b>Specification</b>  Code from 0 ~ 9 dependent on different electrical specification	<b>Packing</b>  T : 7" Reeled G : 10" Reeled B : Bulk X : SFC product

**PACKAGING: Plastic Tape specifications** (unit :mm)



Index	Ao	Bo	ΦD	T	W
Dimension (mm)	3.86 ± 0.10	7.92 ± 0.10	1.55 ± 0.05	1.35 ± 0.10	16.0 ± 0.30
Index	E	F	Po	P1	P2
Dimension (mm)	1.75 ± 0.10	7.50 ± 0.10	4.00 ± 0.10	8.00 ± 0.10	2.00 ± 0.10

**Reel dimensions**

Index	A	B	C	D
Dimension (mm)	Φ178	Φ60.0	Φ13.5	16.5±0.1

Typing Quantity: 1000 pieces per 7" reel

**CAUTION OF HANDLING****Limitation of Applications**

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects, which might directly cause damage to the third party's life, body or property.

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Medical equipment
- (5) Disaster prevention / crime prevention equipment
- (6) Traffic signal equipment
- (7) Transportation equipment (vehicles, trains, ships, etc.)
- (8) Applications of similar complexity and /or reliability requirements to the applications listed in the above.

**Storage condition**

- (1) Products should be used in 6 months from the day of WALSIN outgoing inspection, which can be confirmed.
- (2) Storage environment condition.
  - Products should be storage in the warehouse on the following conditions.
  - Temperature : -10 to +40°C
  - Humidity : 30 to 70% relative humidity
  - Don't keep products in corrosive gases such as sulfur. Chlorine gas or acid or it may cause oxidization of electrode, resulting in poor solderability.
  - Products should be storage on the palette for the prevention of the influence from humidity, dust and son on.
  - Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on.
  - Products should be storage under the airtight packaged condition.