

## Original Design Chip Antenna Data Sheet

**- P/N : ODBWPTR5020 -**

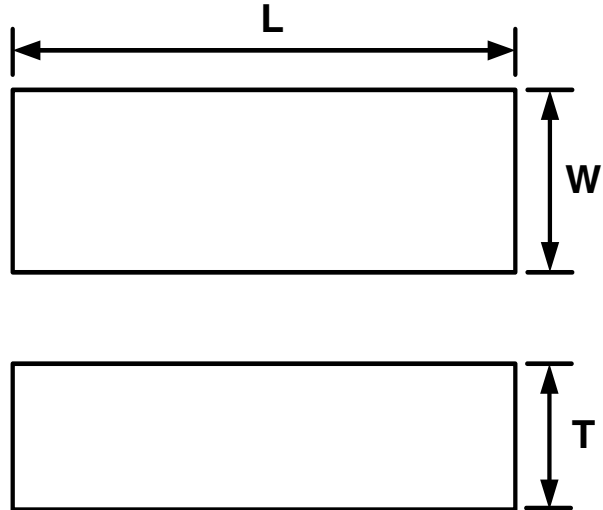
<b>- Application Frequency</b>	
	<b>Band[MHz]</b>
<b>Bluetooth(2.4GHz WiFi) &amp; 5GHz WiFi</b>	<b>Bluetooth : 2400 ~ 2485 &amp; WiFi : 5150 ~ 5825</b>

# Dielectric Chip Antenna

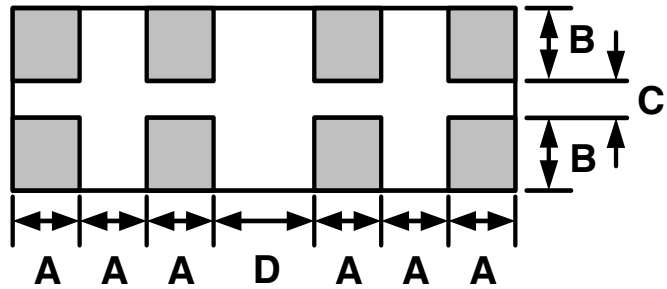


## ■ ODBWPTR5020 Dimension

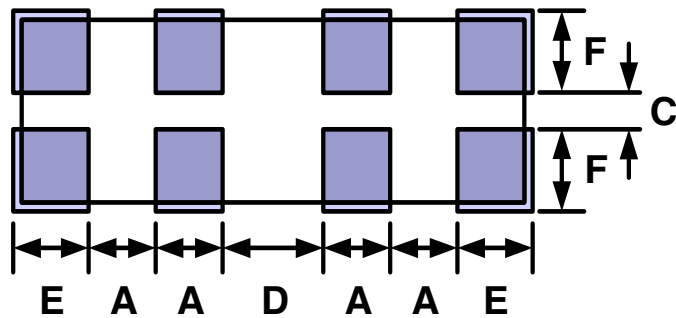
Chip Antenna Dimension



Chip Antenna Soldering Pad Dimension



PCB Soldering Land Dimension



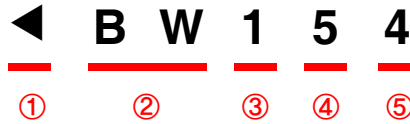
Parameter	L	W	T	A	B	C	D	E	F
Value[mm]	5.0 ± 0.1	2.0 ± 0.1	1.2 ± 0.1	0.6	0.8	0.4	1.4	0.7	0.9

Unless Specified tolerances are ± 0.05 mm

# Dielectric Chip Antenna

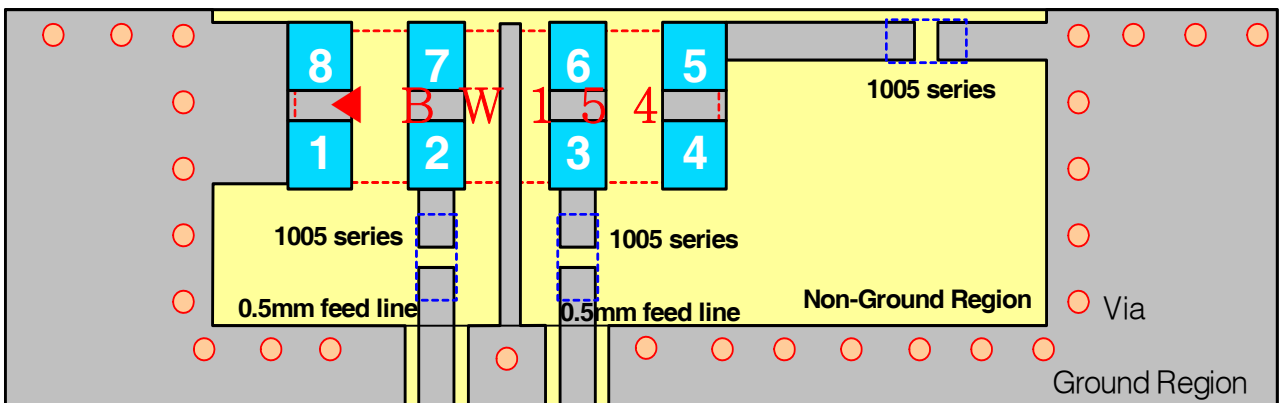


## Antenna Marking System



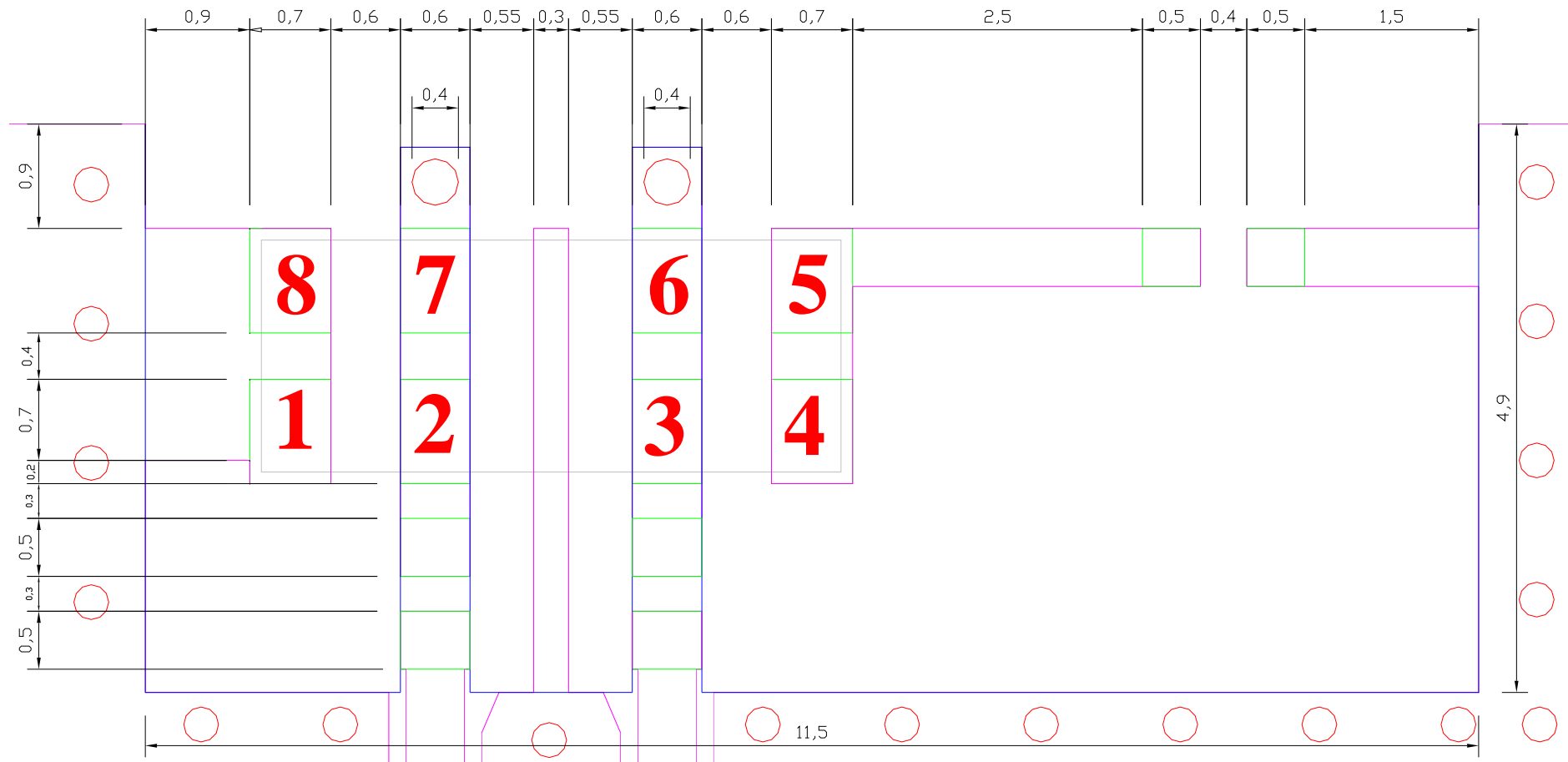
ITEM	DESCRIPTION																																																																		
① Input Signal	Input Signal																																																																		
② Serial	Bluetooth(2.4GHz WiFi) Band and 5GHz WiFi Band																																																																		
③ Year	Ex) 1 - 2011, 2 - 2012, ⋯⋯ , 9 - 2019, ⋯⋯																																																																		
④ Month	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>January</td> <td>February</td> <td>March</td> <td>April</td> <td>May</td> <td>June</td> </tr> <tr> <td>7</td> <td>8</td> <td>9</td> <td>A</td> <td>B</td> <td>C</td> </tr> <tr> <td>July</td> <td>August</td> <td>September</td> <td>October</td> <td>November</td> <td>December</td> </tr> </table>	1	2	3	4	5	6	January	February	March	April	May	June	7	8	9	A	B	C	July	August	September	October	November	December																																										
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## Antenna PAD Information



# Dielectric Chip Antenna

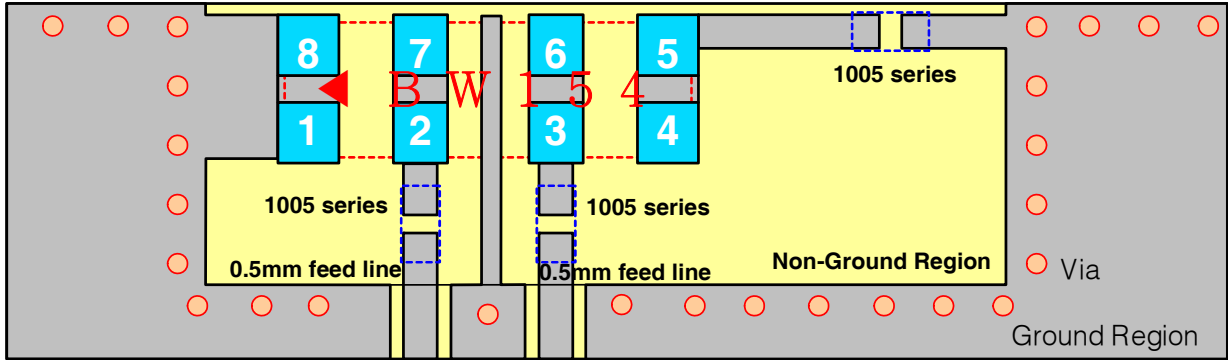
## ■ AutoCAD Drawing of Reference PCB Design for ODBWPTR5020 Product



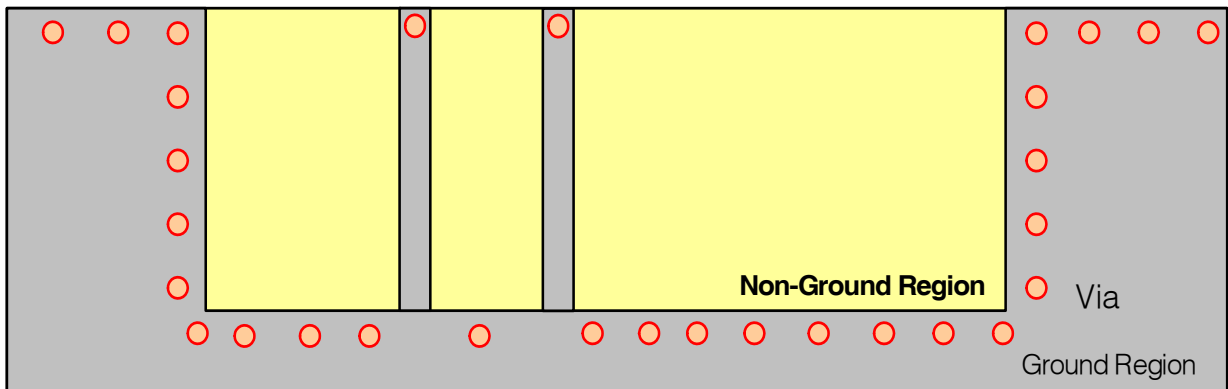
# Dielectric Chip Antenna



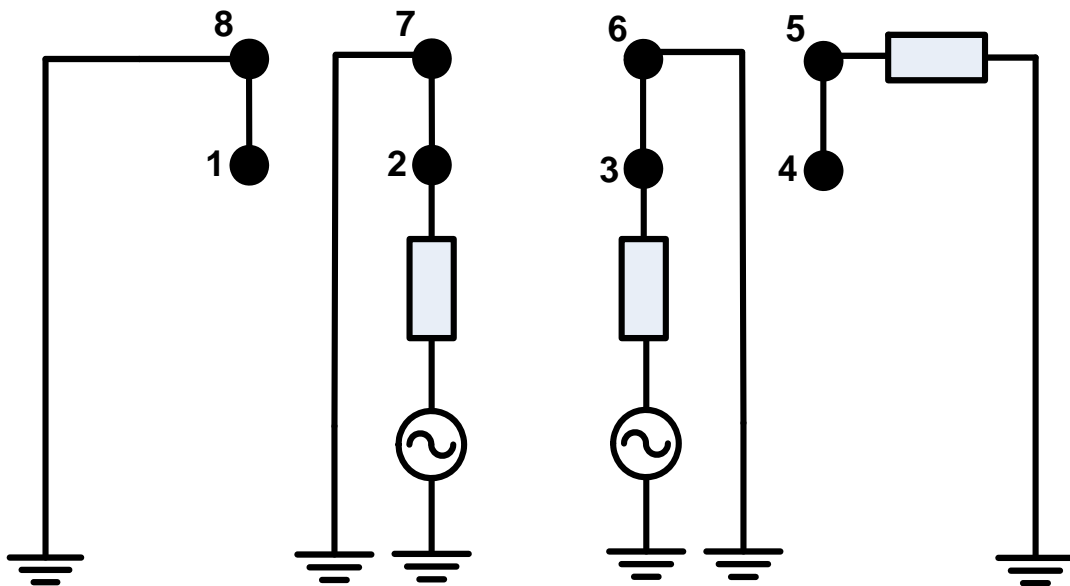
## ■ FEEDING METHOD (unit : mm, tolerance : $\pm 0.05$ )



<Top View>



<Bottom View>



< Equivalent Circuit >

# Dielectric Chip Antenna



## Matching Value

Band (MHz)	Dual Feeding	Single Feeding
Matching Value (Default)		
PCB Artwork (Example)		

## Temperature condition

	온도범위	단위
사용온도	-40 ~ +110	℃
보관온도	-40 ~ + 70	℃

- 온도조건 Test 조건

	항목	온도범위
사용온도	저온	-75 ℃에서 24시간 정상동작
	고온	+150 ℃에서 24시간 정상동작
보관온도	저온	-75 ℃에서 1000 hr 방치 시 정상동작
	고온	+85 ℃에서 1000 hr 방치 시 정상동작

\* 고온 방치 시 포장재 보관온도 문제로 85 ℃ 이상 불가함.

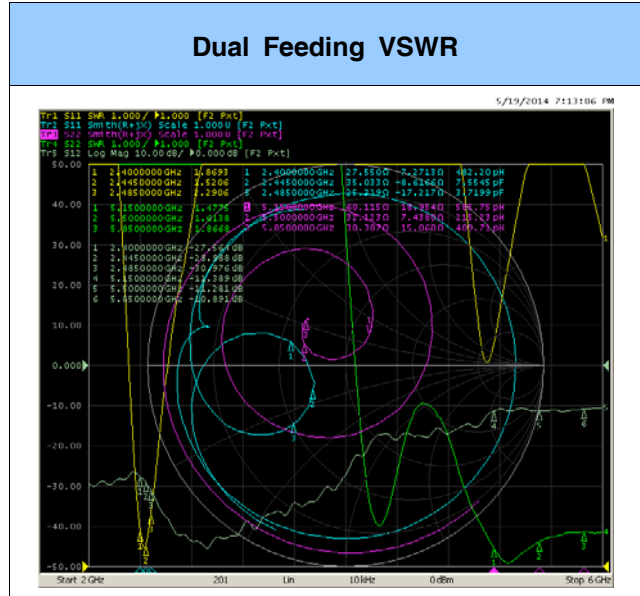
# Dielectric Chip Antenna



## - Dual Feeding 3D Passive Gain For BT&WiFi

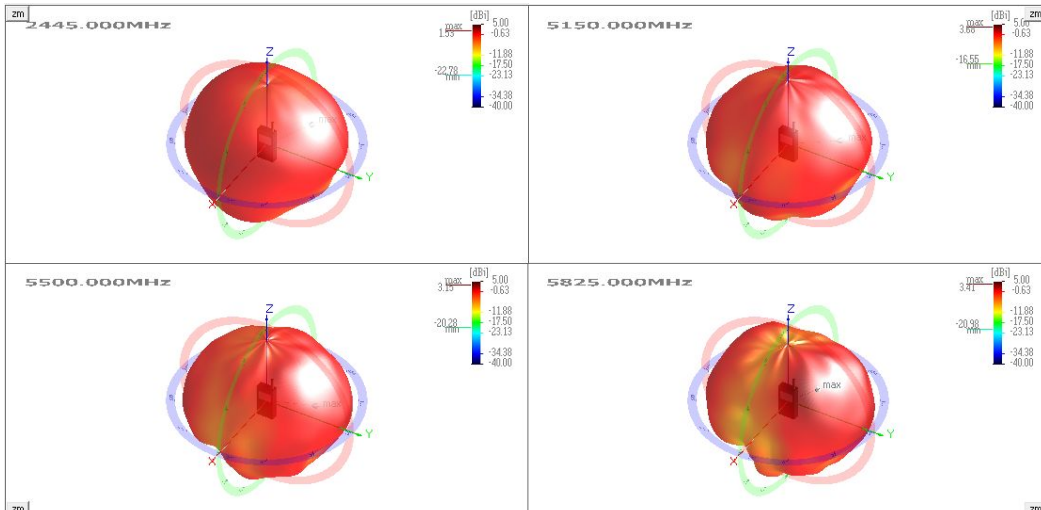
### Gain & VSWR

	Peak [dBi]	Average [dBi]	Efficiency [%]
2400MHz	1.38	-0.96	80.09
2445MHz	1.47	-0.84	82.43
2485MHz	0.86	-1.60	69.26
5150MHz	2.35	-1.40	72.50
5500MHz	2.54	-1.41	72.30
5825MHz	3.36	-1.46	71.47



### 3D Radiation Pattern

## Dual Feeding 3D Passive BT/WiFi



No.	Freq.	PwrSun	Eff.[%]	Avg.[dBi]	Peak[dBi]	Theta[deg]	Phi[deg]	H(Theta)=	Avg.[dBi]	Peak[dBi]	Phi[deg]	BW[deg]	E1(Phi=0)	Avg.[dBi]	Peak[dBi]	Theta[deg]	BW[deg]	E2(Phi=90)	Avg.[dBi]	Peak[dBi]	Theta[deg]	BW[deg]
1	2400.000	80.09	80.09	-0.96	1.38	90.00	195.00	0.14	1.38	1.95	195.00	999.00	-0.72	1.24	-90.00	143.98	-1.64	1.12	-60.00	203.58		
2	2425.000	88.53	88.53	-0.53	1.86	75.00	240.00	0.55	1.59	1.80	180.00	999.00	-0.33	1.59	-90.00	134.37	-1.20	1.51	-60.00	204.47		
3	2445.000	82.43	82.43	-0.84	1.47	75.00	240.00	0.32	1.15	1.80	180.00	999.00	-0.68	1.27	-120.00	128.88	-1.53	1.22	-60.00	205.19		
4	2465.000	73.01	73.01	-1.37	0.98	75.00	240.00	-0.15	0.49	240.00	999.00	-1.22	0.72	-120.00	91.01	-2.03	0.69	-60.00	208.11			
5	2485.000	69.26	69.26	-1.60	0.86	75.00	255.00	-0.33	0.40	240.00	999.00	-1.44	0.60	75.00	116.55	-2.26	0.52	-75.00	107.93			
6	5150.000	72.50	72.50	-1.40	2.35	120.00	180.00	-0.92	1.10	120.00	999.00	-0.32	2.35	-120.00	65.69	-1.69	0.95	75.00	111.86			
7	5250.000	80.74	80.74	-0.93	2.78	135.00	180.00	-0.23	1.87	120.00	999.00	-0.14	2.78	-135.00	55.84	-1.08	1.31	75.00	123.49			
8	5350.000	64.30	64.30	-1.92	1.46	120.00	165.00	-1.26	0.99	105.00	123.20	-1.61	1.38	-135.00	53.52	-1.92	0.97	75.00	102.74			
9	5500.000	72.30	72.30	-1.41	2.54	90.00	105.00	-0.47	2.54	105.00	99.35	-1.59	1.69	-135.00	50.79	-1.26	1.72	90.00	103.53			
10	5725.000	54.60	54.60	-2.63	1.79	45.00	75.00	-1.49	1.77	105.00	100.79	-4.02	-0.99	-135.00	50.97	-2.23	1.52	45.00	86.72			
11	5775.000	45.05	45.05	-3.46	1.04	90.00	105.00	-2.23	1.04	105.00	101.50	-5.48	-1.96	-150.00	48.72	-2.99	0.79	45.00	88.51			
12	5825.000	71.47	71.47	-1.46	3.36	45.00	60.00	-0.51	2.61	105.00	101.17	-3.85	-0.68	-135.00	47.98	-0.92	2.67	45.00	87.70			

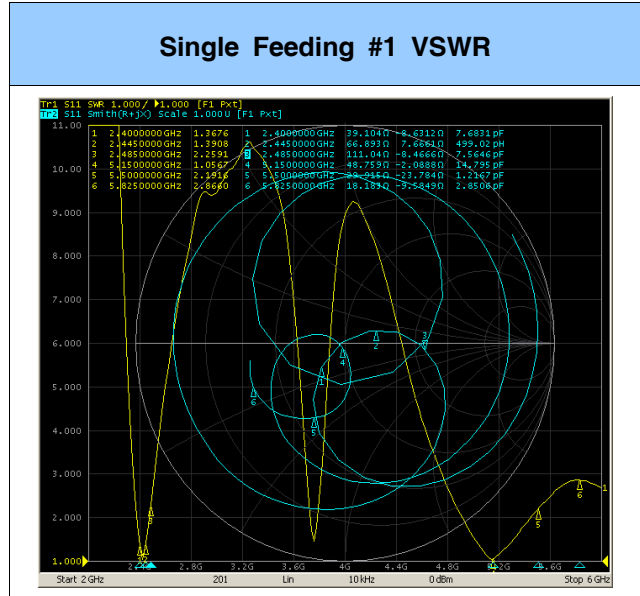
# Dielectric Chip Antenna



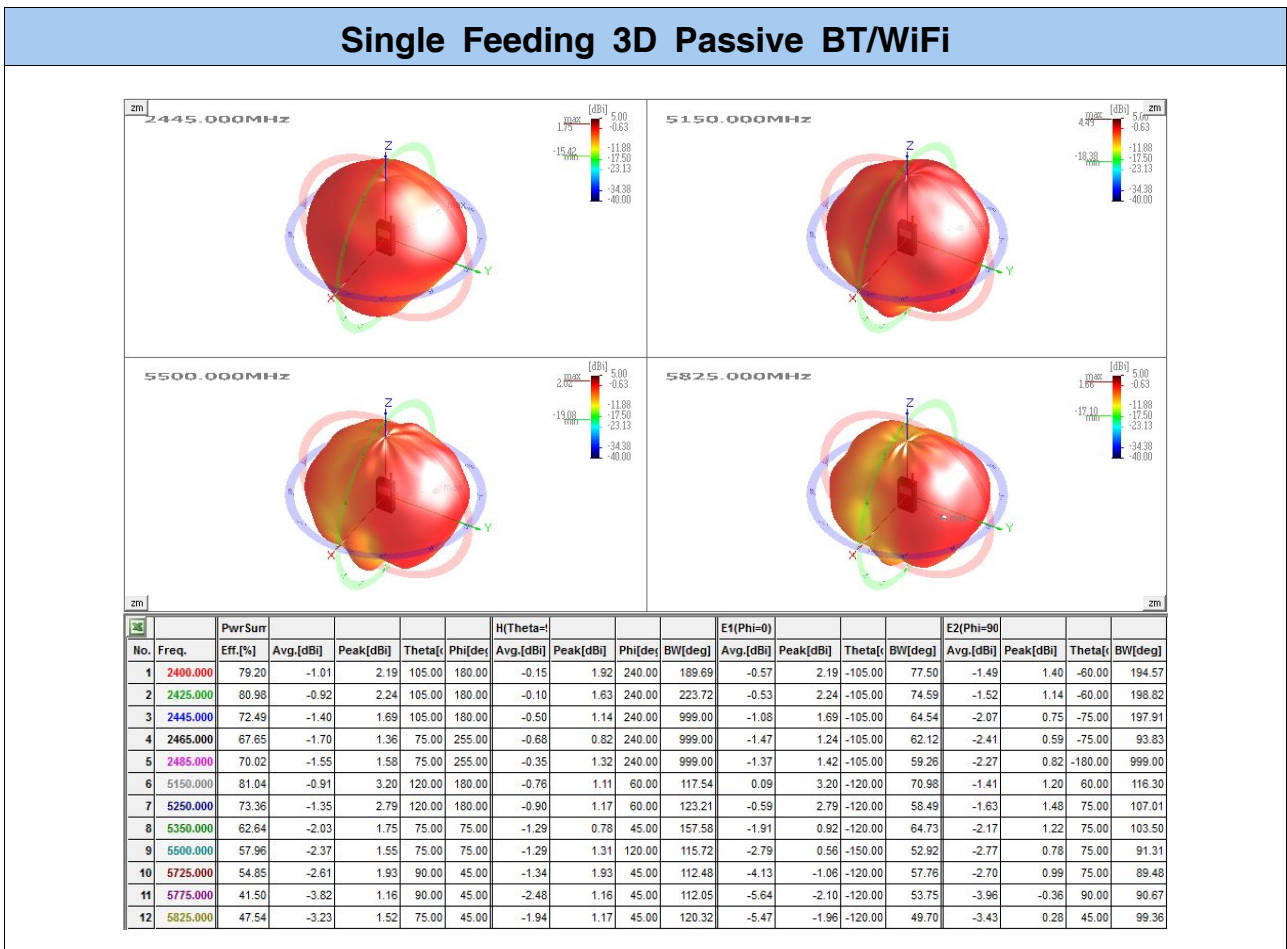
- Single Feeding 3D Passive Gain For **BT&WiFi**

## Gain & VSWR

	Peak [dBi]	Average [dBi]	Efficiency [%]
2400MHz	2.19	-1.01	79.20
2445MHz	1.69	-1.40	72.49
2485MHz	1.58	-1.55	70.02
5150MHz	3.20	-0.91	81.04
5500MHz	1.55	-2.37	57.96
5825MHz	1.52	-3.23	47.54



## 3D Radiation Pattern





# APPROVAL SHEET

CUSTOMER: THINKWARE CORPORATION

Manufacturer Part No: SPA1575-1602S15P4F

Manufacturer Serial No: \_\_\_\_\_

Customer Part No: \_\_\_\_\_

Customer Approved By: \_\_\_\_\_

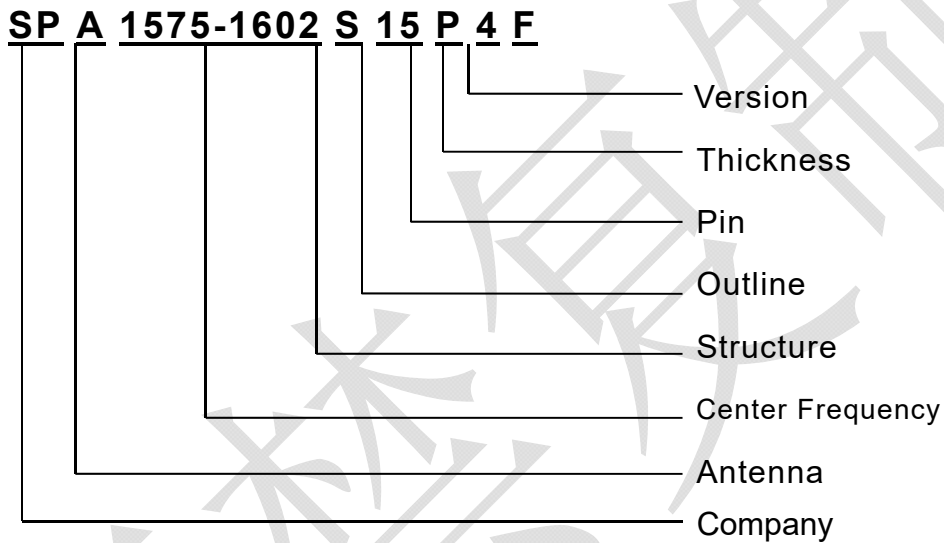
Approved Date: 2017.10.26

<b>Design:</b> YS AHN	<b>Check:</b>	<b>Approval:</b> JS AHN
<b>Part NO:</b> SPA1575-1602S15P4F	<b>Revision:</b> 01	<b>Page:</b> 1 / 9

## 1. Introduction

This product is the size of 15X15X4MM GPS PATCH ANTENNA, with high gain, small features, suitable for outdoor handheld electronic products, locator tracker, etc..

## 2. Part No

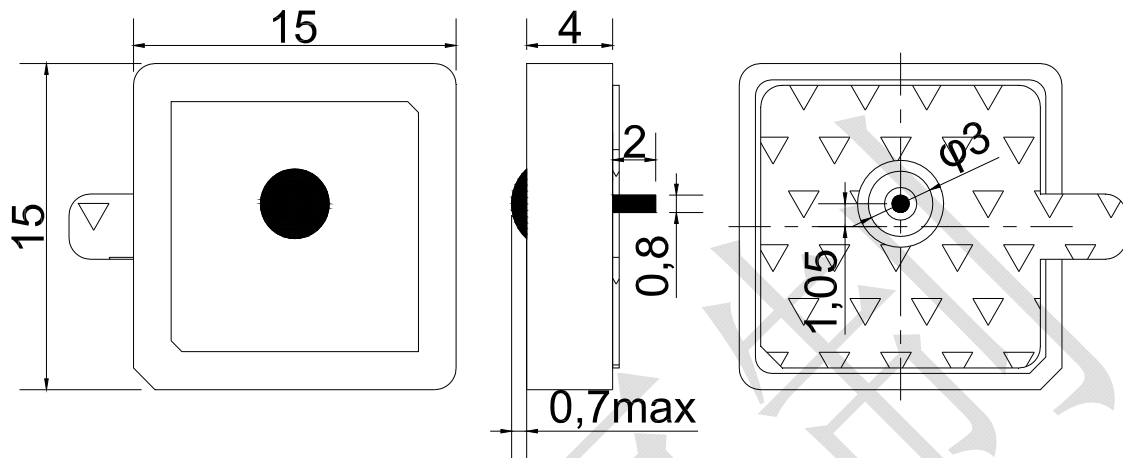


## 3. Composition and Materials

NO	PART NAME	Composition & Materials
3.1	antenna substrate	Dielectric Ceramic
3.2	pin	Copper and tinplated
3.3	electrode	Ag Plated
3.4	ground base	Ag Plated
3.5	adhesive type	NITTO 5000

Design: YS AHN	Check:	Approval: JS AHN
Part NO: SPA1575-1602S15P4F	Revision: 01	Page: 2 / 9

#### 4. Appearance and Dimensions:



Tolerance Unless Otherwise Specified:  $\pm 0.30$   
Unit: mm

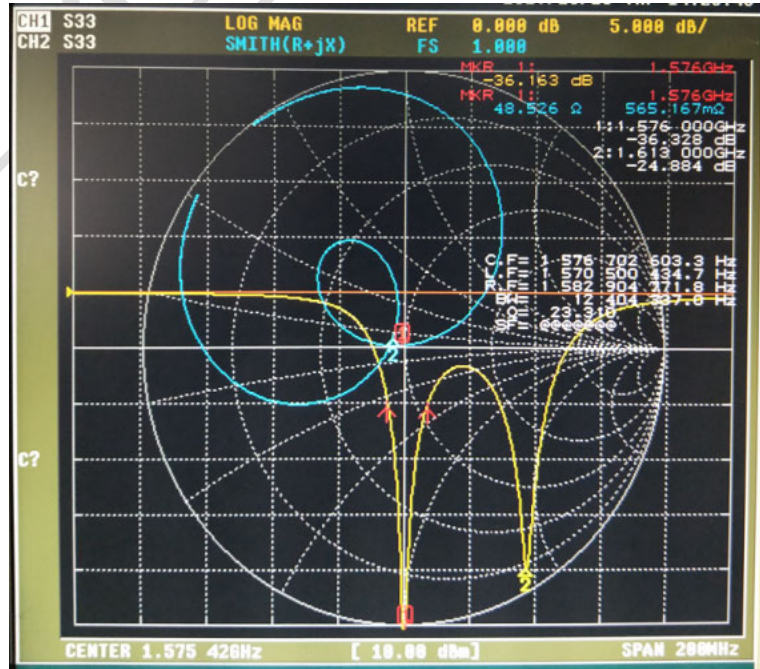
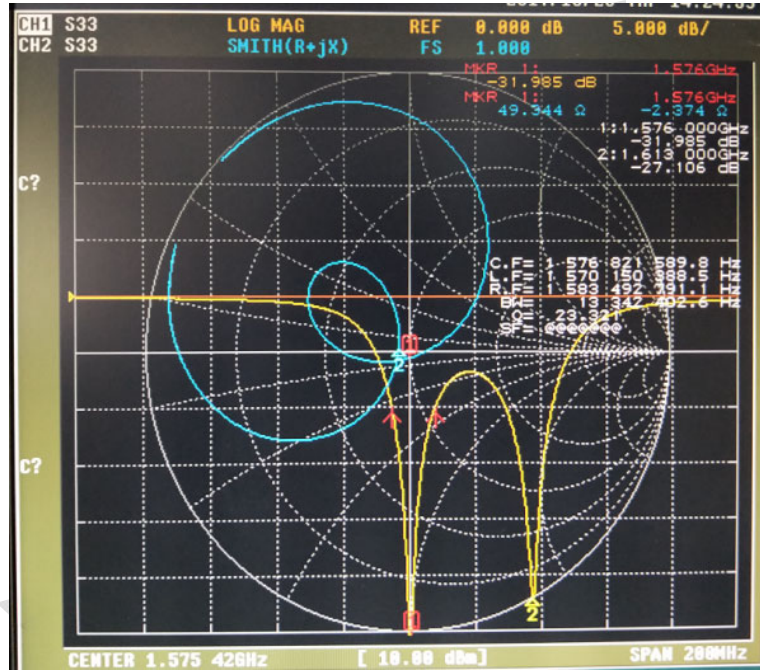
#### 5. Electrical Characteristics

NO.	ITEM	Specifications
5.1	Center Frequency (Mhz)	1576MHz / 1613MHz
5.3	V.S.W.R (at Center Frequency)	$\leq 2.0$
5.4	Gain(Zenith) (dBi typ)	2.0dB typical
5.6	Polarization	Right-Handed Circular
5.7	Impedance ( $\Omega$ )	50
5.8	Test Board	

Design: YS AHN	Check:	Approval: JS AHN
Part NO: SPA1575-1602S15P4F	Revision: 01	Page: 3 / 9

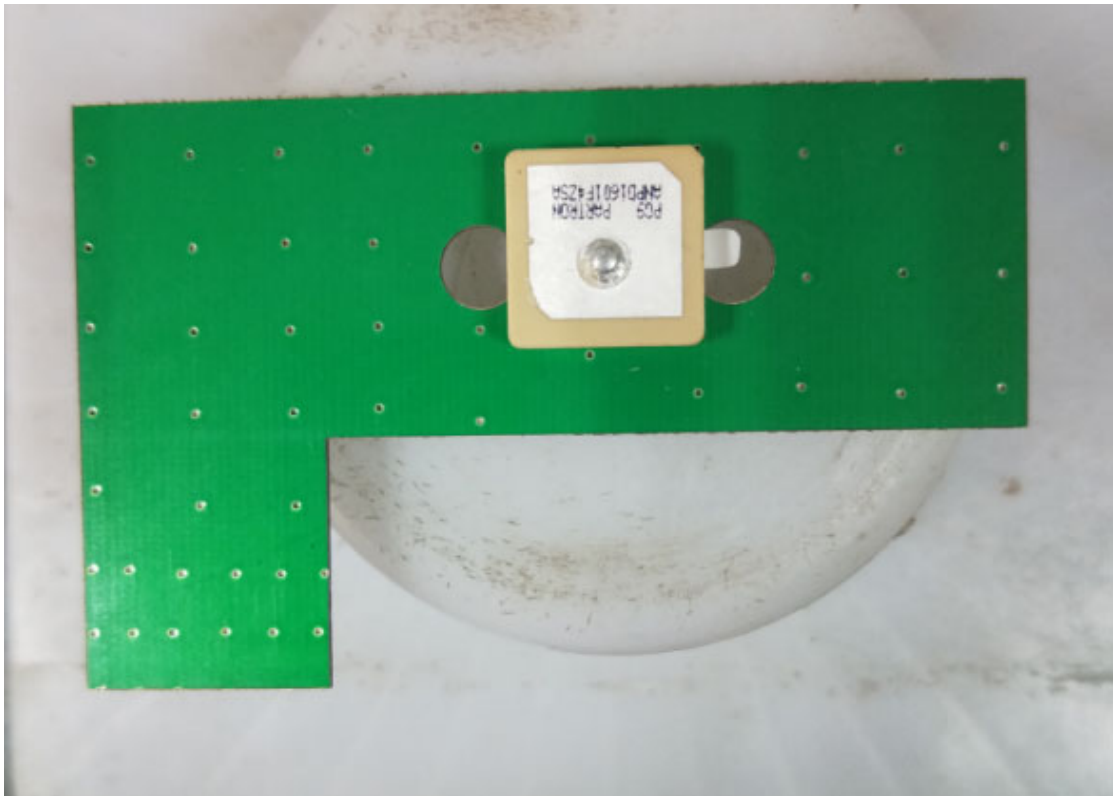
## 6. Characteristic curve

### 6.1 S11 Test Data



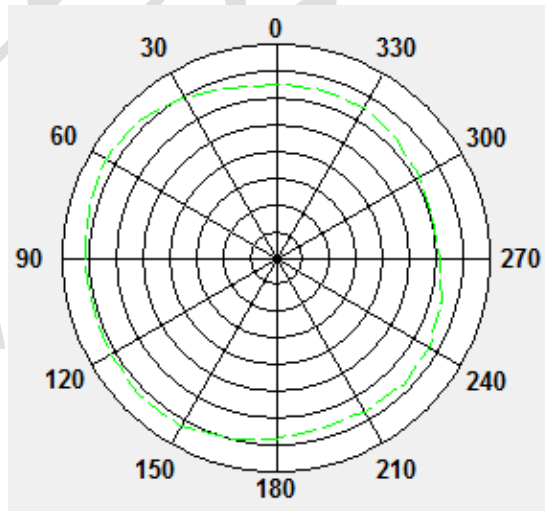
Design: YS AHN	Check:	Approval: JS AHN
Part NO: SPA1575-1602S15P4F	Revision: 01	Page: 4 / 9

## 6.2 TEST FIXTURE



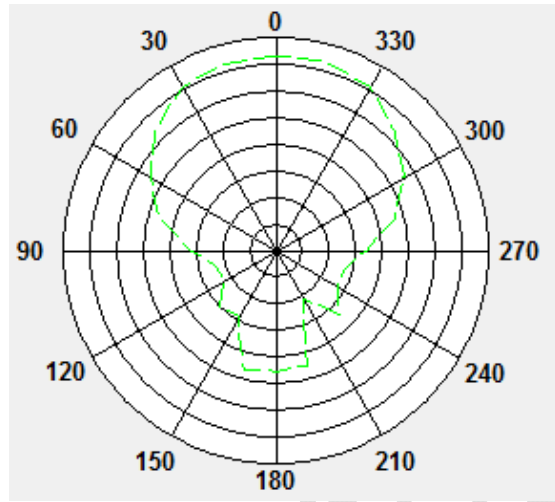
## 6.3 Far-field Power Distribution

XY

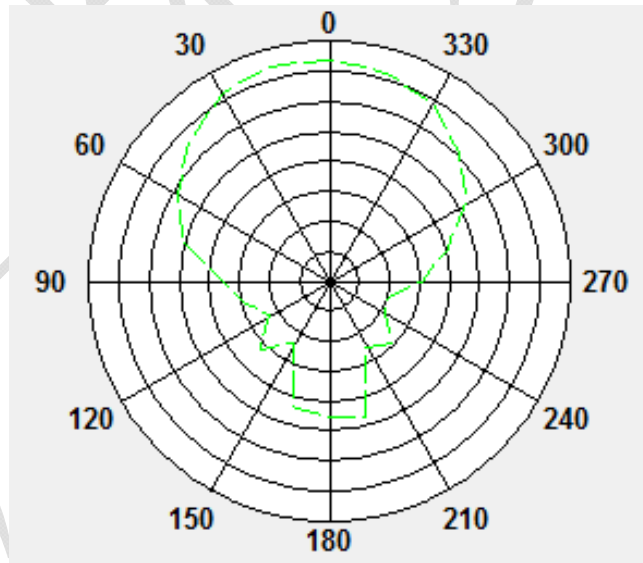


Design: YS AHN	Check:	Approval: JS AHN
Part NO: SPA1575-1602S15P4F	Revision: 01	Page: 5 / 9

**XZ**

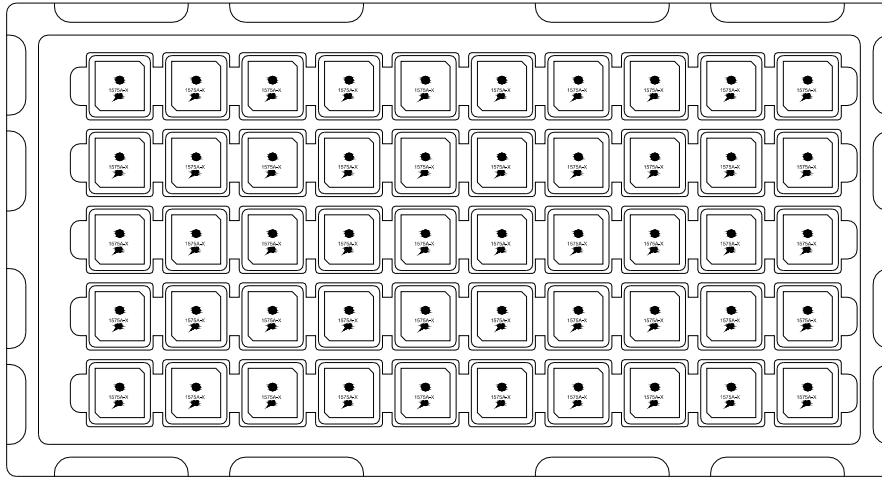


**YZ**



Design: YS AHN	Check:	Approval: JS AHN
Part NO: SPA1575-1602S15P4F	Revision: 01	Page: 6 / 9

## 7. Packing



Tray 50pcs

## 8. Reliability: MTBF $\geq$ 93710h

Environment condition

Temperature: 80°C

Quantity: 20pcs

Sustained Time: 240h

Relative Humidity: 85%

Reliability: 90%

## 9. Environmental specifications

### 9.1 Moisture Proof

The device should satisfy the electrical characteristics specified in paragraph 5.1~5.4 after exposed to the temperature 40 $\pm$ 2°C

Design: YS AHN	Check:	Approval: JS AHN
Part NO: SPA1575-1602S15P4F	Revision: 01	Page: 7 / 9

and the relative humidity 90~95% RH for 96 hours and 1~2 hours recovery time under normal condition.

#### 9. 2 Vibration Resist

The device should satisfy the electrical characteristics specified in paragraph 5.1~5.4 after applied to the vibration of 10 to 55Hz with amplitude of 1.5mm for 2 hours each in X , Y and Z directions.

#### 9. 3 Drop Shock

The device should satisfy the electrical characteristics specified in paragraph 5.1~5.4 after dropping onto the hard wooden board from the height of 30cm for 3 times each facet of the 3 dimensions of the device.

#### 9. 4 High Temperature Endurance

The device should satisfy the electrical characteristics specified in paragraph 5.1~5.4 after exposed to temperature  $80\pm 5^{\circ}\text{C}$  for  $24\pm 2$  hours and 1~2 hours recovery time under normal temperature.

#### 9. 5 Low Temperature Endurance

The device should also satisfy the electrical characteristics specified in paragraph 5.1~5.4 after exposed to the temperature  $-40^{\circ}\text{C}\pm 5^{\circ}\text{C}$  for  $24\pm 2$  hours and to 2 hours recovery time under normal temperature.

<b>Design: YS AHN</b>	<b>Check:</b>	<b>Approval: JS AHN</b>
<b>Part NO: SPA1575-1602S15P4F</b>	<b>Revision: 01</b>	<b>Page: 8 / 9</b>



## 10. The Basic Environment

Temperature range  $25\pm 3^{\circ}\text{C}$

Relative Humidity range 55~75%RH

Operating Temperature range  $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$

Storage Temperature range  $-40^{\circ}\text{C}\sim+100^{\circ}\text{C}$

## 11. Note

11.1 Because the antenna will show different characteristics in the different substrate, when our product is mounted to your product, please make sure that your product is according to your specifications evaluated and confirmed

11.2 We cannot warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.

11.3 The product will get free warranty for three months since the date of purchase users operate in the correct way; users will have to pay cost of the materials and maintaining fee out of the condition.

11.4 Electrostatic sensitive device. Observe precautions for handling.

<b>Design:</b> YS AHN	<b>Check:</b>	<b>Approval:</b> JS AHN
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