

2014.11.21

MB-RD-E141121-01

# SPECIFICATIONS SHEET

**GPS ANTENNA  
( SG51x )**

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## 1. General Application

This document specifies the chip antenna for the mobile communication terminal.

Model Number	SG51x
Application	GPS

## 2. Technical Specification

### 2.1 Electrical Specification

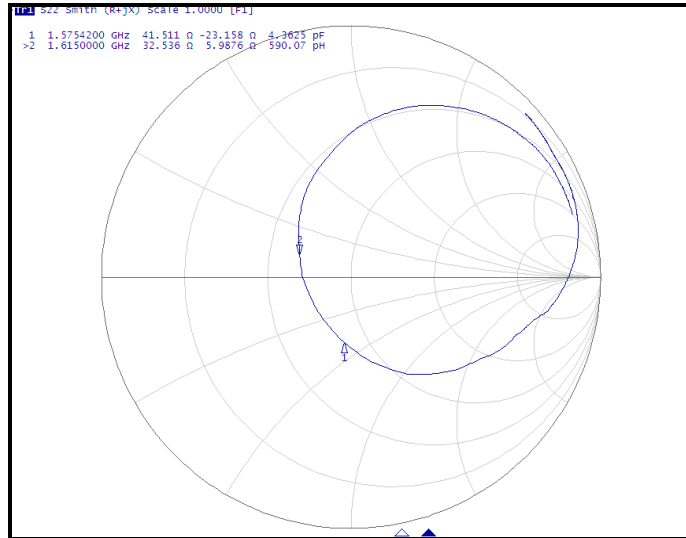
No	Item	Specification	Remarks
1	Frequency Range	1575.42MHz 1602 MHz ~1616 MHz	
2	VSWR	2.0: 1	
3	Impedance	50 Ω	
4	Polarization	Linear	
5	Radiation Pattern	Omni directional	

### 2.2 Mechanical Specification

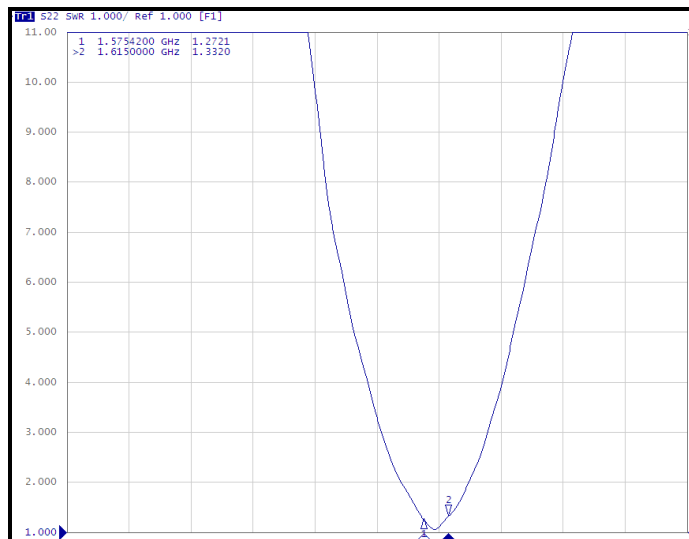
No	Item	Specification	Remarks
1	Dimension	3 * 11 * 2.0(H)mm	
2	Radiator Material	Copper	
3	Operating Temperature	-30℃ ~ +80℃	
4	Operating Humidity	10% ~ 90%	
5	Weight	N/A	
6	Connector Type	Solder	

## 3. Measurement Data

### 3.1 VSWR & Smith Chart



< Smith Chart >



< VSWR >

Fig 2. VSWR & Smith Chart

### 3.2 Test Result (3D Efficiency)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Frequency [MHz]	1550	1560	1565	1570	1575	1580	1585	1590	1595	1600	1605	1610	1615	1620	1630
Efficiency [dB]	-2.69	-2.71	-2.63	-2.56	-2.46	-2.41	-2.41	-2.28	-2.42	-2.34	-2.34	-2.37	-2.37	-2.34	-2.40
Efficiency [%]	53.78	53.56	54.53	55.45	56.76	57.42	57.43	59.17	57.27	58.36	58.31	57.98	58.00	58.38	57.51
TRG [dB]	-2.69	-2.71	-2.63	-2.56	-2.46	-2.41	-2.41	-2.28	-2.42	-2.34	-2.34	-2.37	-2.37	-2.34	-2.40
TRG <sub>g</sub> [dB]	-5.20	-5.22	-5.15	-5.10	-5.00	-5.03	-4.96	-4.83	-4.98	-4.91	-4.91	-4.92	-4.89	-4.83	-4.86
Gain <sub>g Peak</sub> [dBi]	1.25	1.21	1.27	1.32	1.43	1.40	1.48	1.61	1.46	1.53	1.54	1.54	1.55	1.60	1.55
Gain <sub>g Min</sub> [dBi]	-23.05	-23.79	-23.99	-24.15	-24.13	-24.50	-24.72	-24.75	-25.16	-24.72	-25.00	-24.92	-24.89	-25.01	-25.34
TRG <sub>g</sub> [dB]	-6.28	-6.29	-6.20	-6.10	-5.99	-5.85	-5.93	-5.80	-5.93	-5.84	-5.85	-5.89	-5.92	-5.93	-6.04
Gain <sub>g Peak</sub> [dBi]	-0.92	-0.98	-0.93	-0.86	-0.79	-0.70	-0.84	-0.76	-0.96	-0.95	-1.03	-1.14	-1.24	-1.31	-1.60
Gain <sub>g Min</sub> [dBi]	-34.88	-35.11	-34.70	-33.94	-33.53	-32.83	-33.06	-32.50	-33.14	-33.10	-33.00	-32.86	-33.18	-33.77	-39.20
UHRG [dB]	-5.42	-5.43	-5.34	-5.27	-5.17	-5.12	-5.11	-4.98	-5.12	-5.03	-5.03	-5.05	-5.05	-5.01	-5.07
UHRG/TRG [%]	53.41	53.53	53.60	53.62	53.63	53.52	53.69	53.73	53.76	53.78	53.82	53.90	53.96	54.06	54.14
H-Plane	-3.39	-3.36	-3.26	-3.18	-3.06	-3.06	-2.96	-2.81	-2.95	-2.87	-2.85	-2.86	-2.83	-2.77	-2.82
E1-Plane, AVG [dB]	-12.19	-11.97	-11.77	-11.61	-11.41	-11.33	-11.19	-10.98	-11.08	-10.97	-10.95	-10.95	-10.91	-10.85	-10.86
E2-Plane, AVG [dB]	-2.83	-2.87	-2.82	-2.79	-2.70	-2.75	-2.70	-2.59	-2.75	-2.69	-2.70	-2.71	-2.69	-2.63	-2.66
Peak Gain [dBi]	1.60	1.56	1.62	1.67	1.76	1.77	1.79	1.91	1.74	1.80	1.78	1.76	1.75	1.79	1.71
Directivity [dB]	4.29	4.27	4.26	4.24	4.22	4.18	4.20	4.19	4.16	4.14	4.12	4.12	4.12	4.13	4.12
Minimum Gain [dBi]	-12.96	-13.14	-13.14	-13.09	-13.02	-13.02	-12.95	-12.80	-12.93	-12.76	-12.65	-12.60	-12.49	-12.34	-12.18
Test Condition	FS														
Antenna Type															
Average Efficiency	-2.45 dB,		56.93 %												

### 3.3 Radiation Pattern

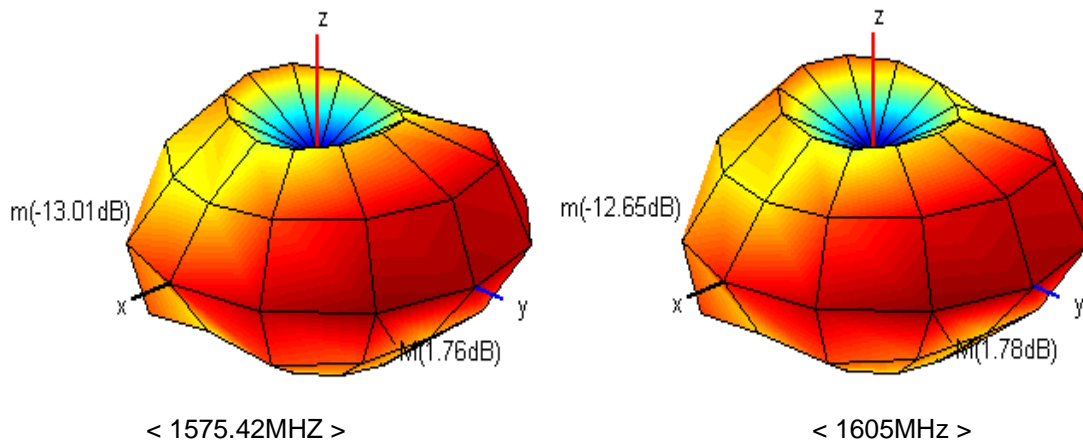
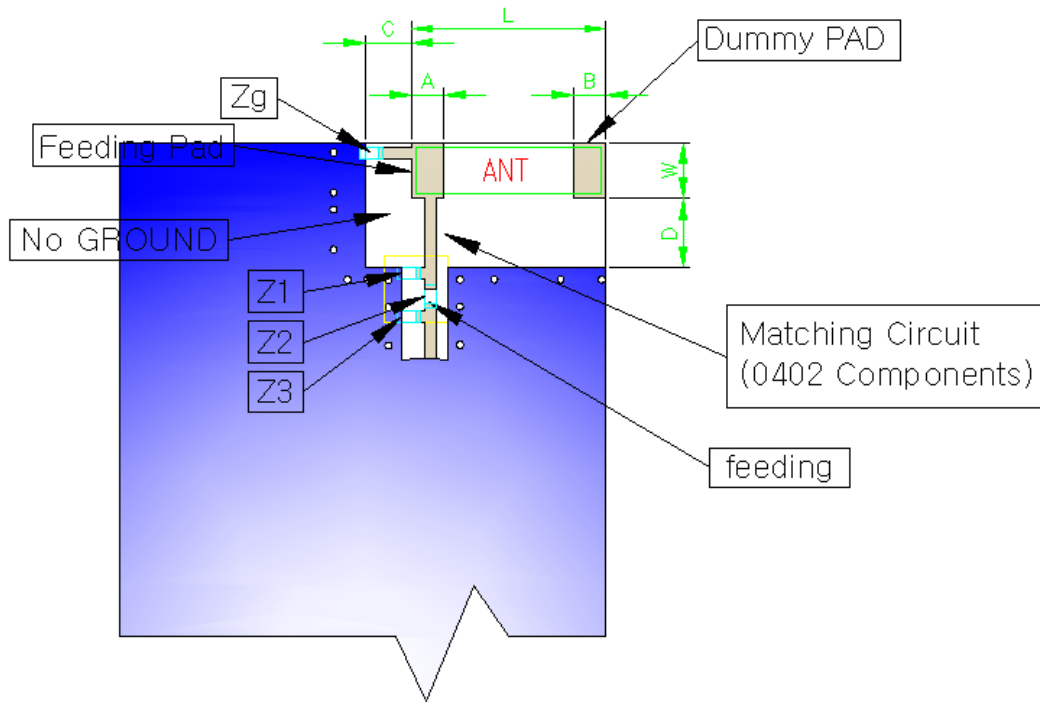


Fig 3. Radiation Pattern

	Efficiency (%)	Efficiency (dB)	UHRG(dB)	Peak Gain ( dBi )
Radiation (1575.42MHz)	<b>56.76</b>	<b>-2.46</b>	<b>-5.17</b>	<b>1.76</b>
Radiation (1605MHz)	<b>58.31</b>	<b>-2.34</b>	<b>-5.85</b>	<b>1.78</b>

## 4. Design Guide

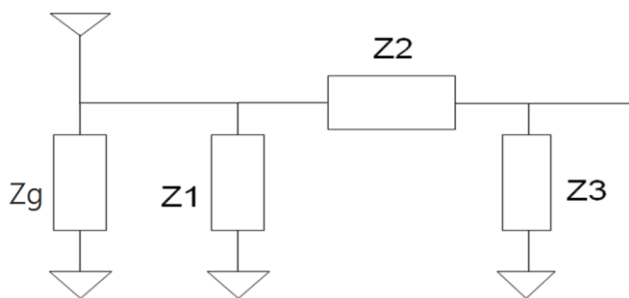
### 4.1 PCB Design Guide



< PCB Design Guide >

	A	B	C	D	L	W
<b>DIM(mm)</b>	<b>1.7</b>	<b>1.7</b>	<b>2.0</b>	<b>3.0</b>	<b>11.4</b>	<b>3.4</b>

### 4.2 Default Condition Maching Circuit



<b>Zg</b>	<b>10nH</b>
<b>Z1</b>	<b>DNI</b>
<b>Z2</b>	<b>9.1nH</b>
<b>Z3</b>	<b>DNI</b>

< Default Matching Value >