

# WX.0022.L4.GAS 4G/GNSS/WIFI ANTENNA

## Specification

### 1.Application:

This application shall apply for antenna unit which shall be used such as automotive, conventional communications, smart home, etc..

### 2.Electrical Specification:


*Those specifications were specially defined for customer's model, and all characteristics were measured under the model's handset testing jig .*

#### 2-1. Frequency Band:

Frequency Band	MHz
4G+WIFI+GNSS	4G Main: 824-960/1710-2690 4G DiV:1710-2690 WIFI: 2400-2500 GNSS: 1561/1575.42

#### 2-2. Impedance

50 ohm nominal

UNLESS OTHER SPECIFIED TOLERANCES ON : X=±                  X.X=±                  X.XX=± ANGLES=±                  HOLEDIA=±		 KINGRF TECHNOLOGY CO., LTD.
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TITLE: WX.0022.L4.GAS 4G/GNSS/WIFI ANTENNA Specification		SPEC REV. P0

## 2-3. VSWR

### 4G Main antenna

Frequency Band(MHz)	824	960	1710	1990	2170	2690
Typical Value:	3.1	3.9	2.2	1.7	1.6	2.0

Measuring Method	<ol style="list-style-type: none"> <li>1. A 50Ω coaxial cable is connected to the antenna. Then this cable is connected to a network analyzer to measure the VSWR.</li> <li>2. Keeping this jig away from metal at least 20 cm</li> </ol>
Picture	

UNLESS OTHER SPECIFIED TOLERANCES ON : <b>X=±</b> <b>X.X=±</b> <b>X.XX=±</b> <b>ANGLES=±</b> <b>HOLEDIA=±</b>			<b>KINGRF TECHNOLOGY CO., LTD.</b>
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## 2-3. VSWR

### 4G Diversity antenna

Frequency Band(MHz)	824	960	1710	1990	2170	2690
Typical Value:	/	/	2.7	1.7	1.4	1.8

Measuring Method	3. A 50Ω coaxial cable is connected to the antenna. Then this cable is connected to a network analyzer to measure the VSWR. 4. Keeping this jig away from metal at least 20 cm														
Picture	<table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Frequency (MHz)</th> <th>SWR</th> </tr> </thead> <tbody> <tr> <td>824.000000</td> <td>8.7611</td> </tr> <tr> <td>960.000000</td> <td>5.8322</td> </tr> <tr> <td>1.71000000</td> <td>2.7495</td> </tr> <tr> <td>1.99000000</td> <td>1.7047</td> </tr> <tr> <td>2.17000000</td> <td>1.4726</td> </tr> <tr> <td>2.69000000</td> <td>1.8876</td> </tr> </tbody> </table>	Frequency (MHz)	SWR	824.000000	8.7611	960.000000	5.8322	1.71000000	2.7495	1.99000000	1.7047	2.17000000	1.4726	2.69000000	1.8876
Frequency (MHz)	SWR														
824.000000	8.7611														
960.000000	5.8322														
1.71000000	2.7495														
1.99000000	1.7047														
2.17000000	1.4726														
2.69000000	1.8876														

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## 2-3. VSWR

WIFI antenna

Frequency Band(MHz)	2400	2450	2500
Typical Value:	1.46	1.05	1.03

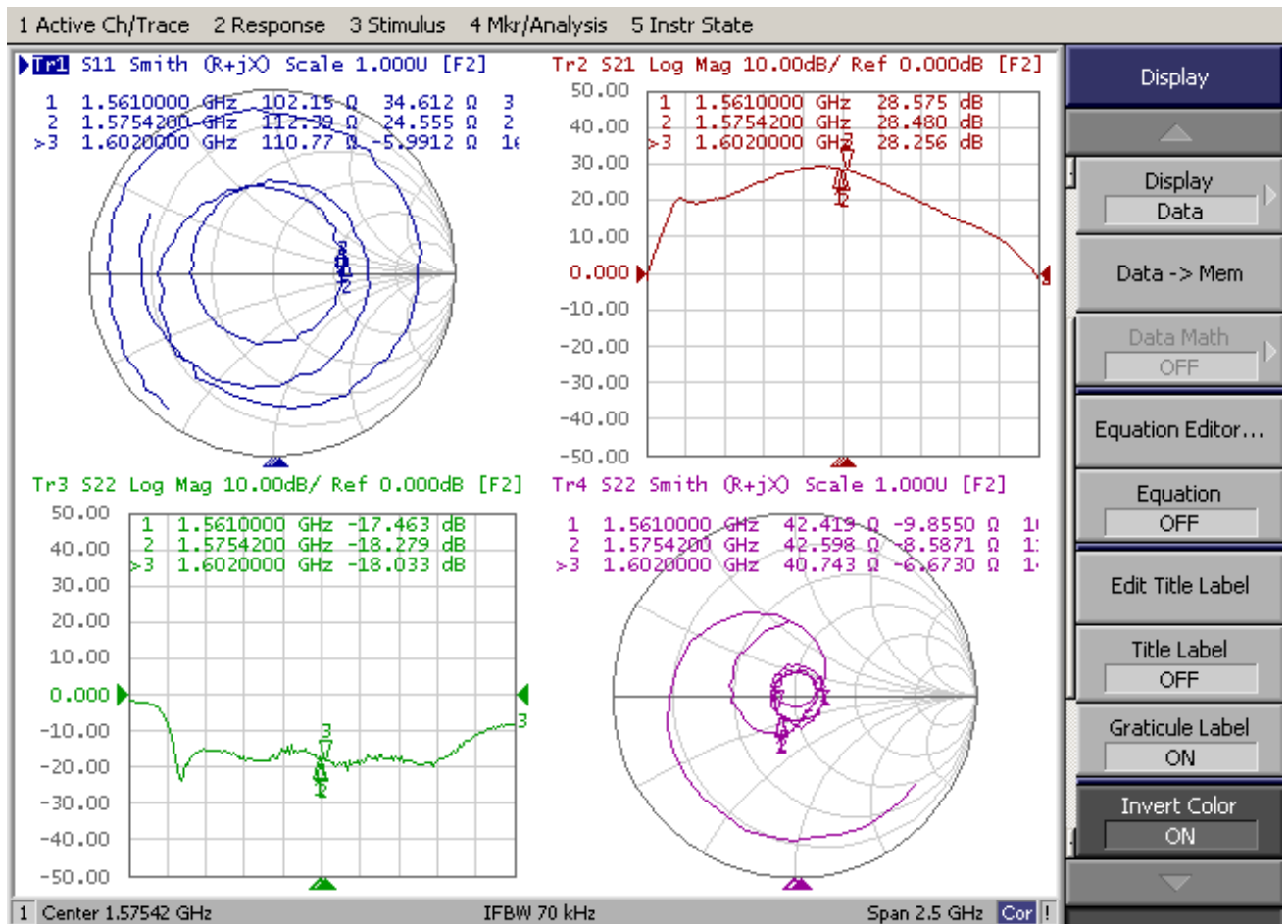
Measuring Method	<p>5. A 50Ω coaxial cable is connected to the antenna. Then this cable is connected to a network analyzer to measure the VSWR.</p> <p>6. Keeping this jig away from metal at least 20 cm</p>
Picture	

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## 2-3. VSWR

### GNSS LNA

Characteristics	Specification
Frequency Range	1560MHz~1602MHz
Gain	28±3 dB
Noise Figure	2.0 dB typ
Output V.S.W.R	2.0 max
Operation Voltage	3.3~5 V
Current	10~25 mA

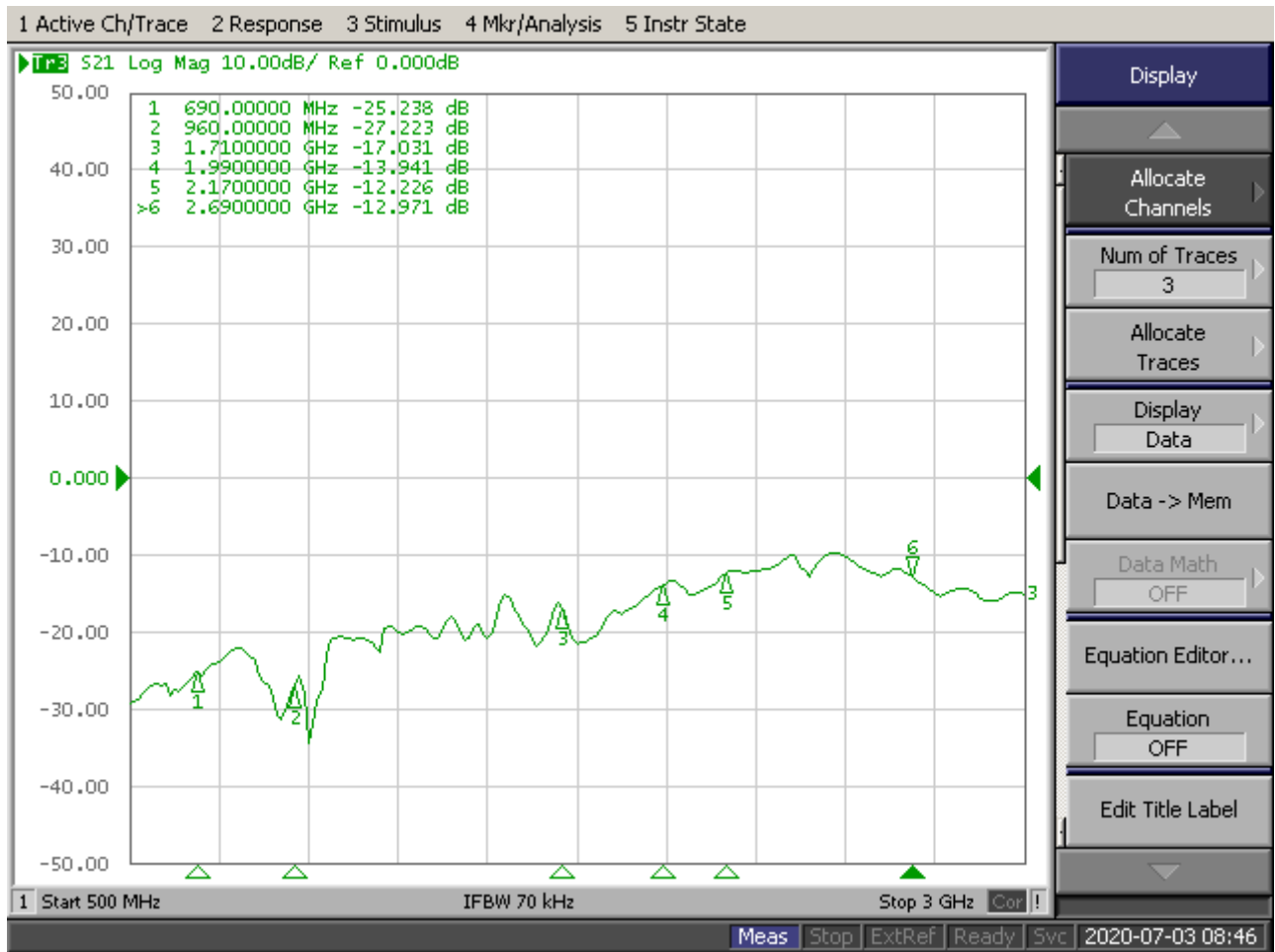


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## 2-4. Antenna Isolation

### 4G Main antenna & WIFI

Frequency Band(MHz)	824	960	1710	1990	2170	2690
Typical Value:	-25	-27	-17	-13	-12	-12

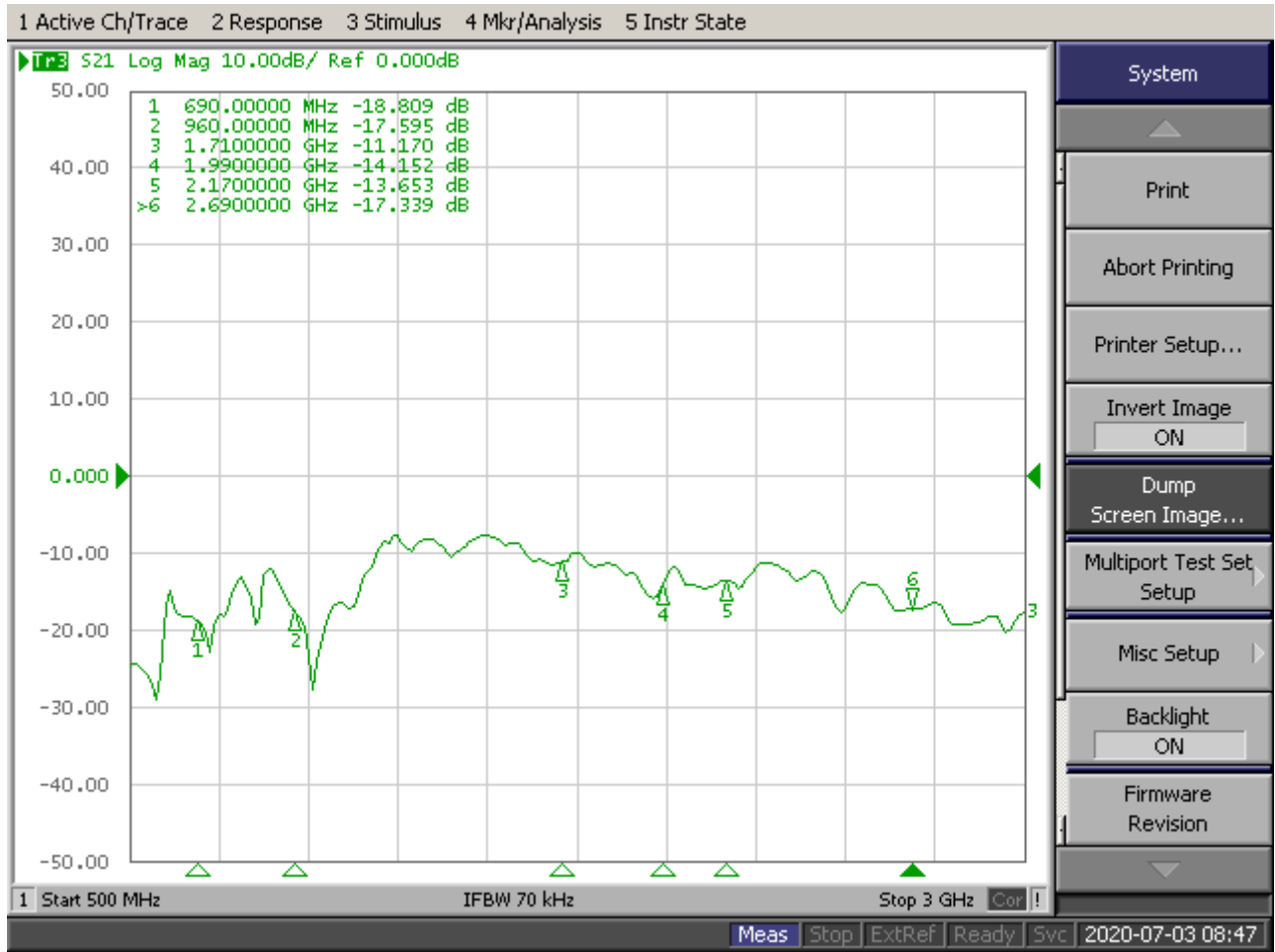


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## 2-4. Antenna Isolation

4G Main antenna & Diversity antenna

Frequency Band(MHz)	824	960	1710	1990	2170	2690
Typical Value:	-18	-17	-11	-14	-13	-17

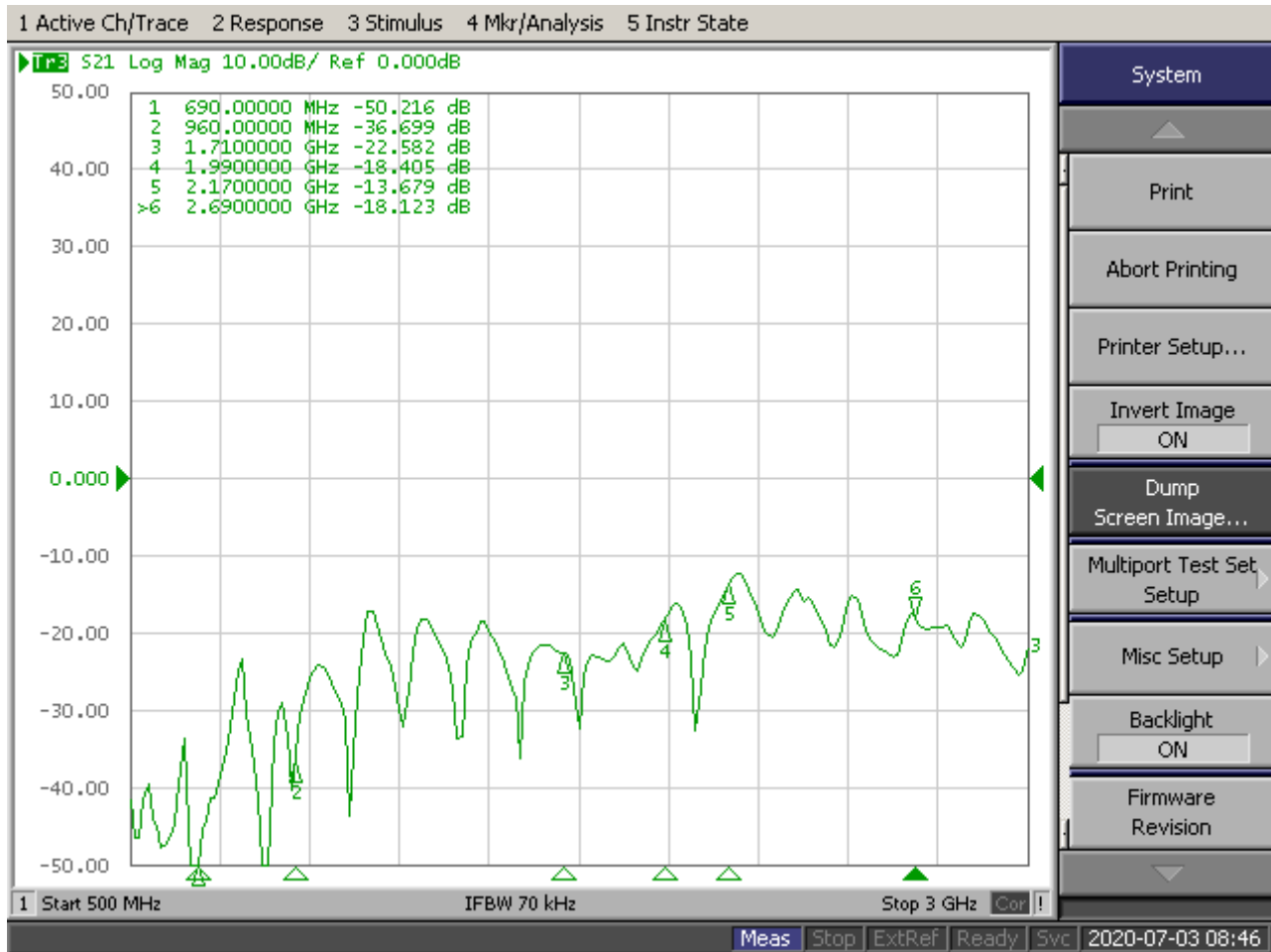


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			P0

## 2-4. Antenna Isolation

### 4G Diversity antenna & WIFI

Frequency Band(MHz)	824	960	1710	1990	2170	2690
Typical Value:	/	/	-22	-18	-13	-18



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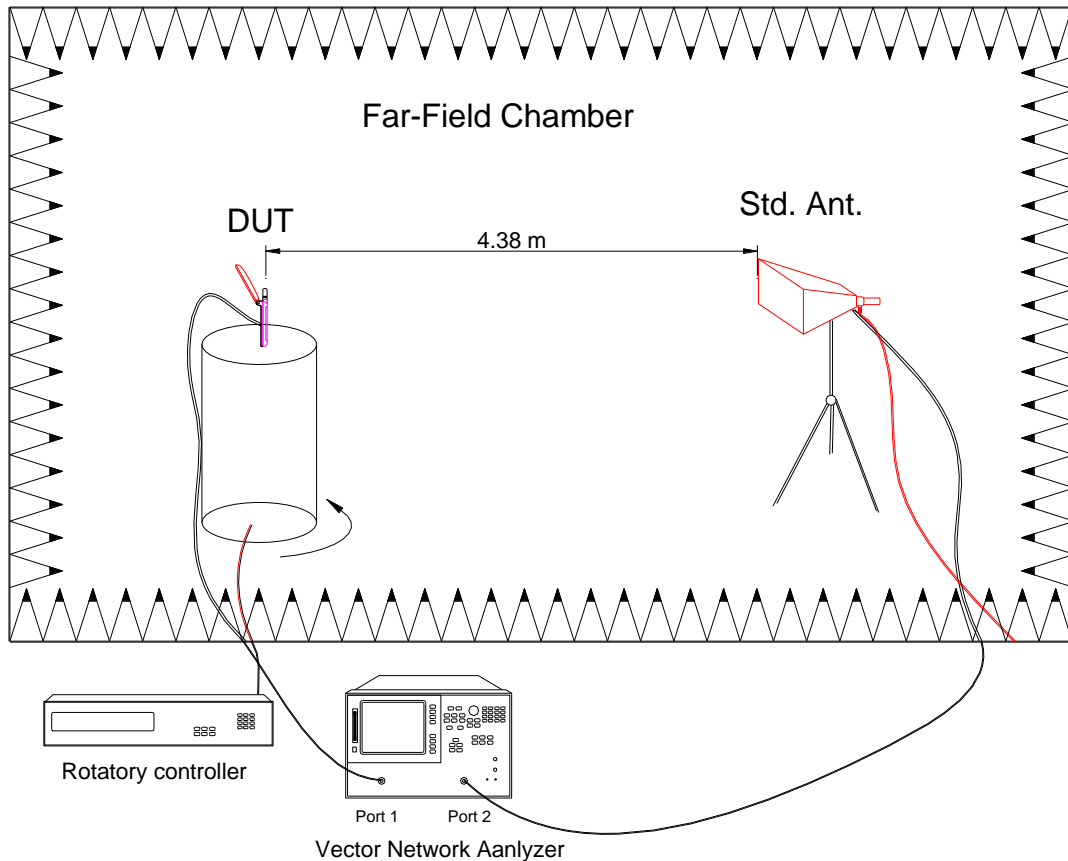


## 2-5. Efficiency and Gain

### 2-5.1 Measure method

1. Using a low loss coaxial cable to link a standard handset jig
2. Fixed this handset jig on chamber's rotator plane
3. Linking jig into network analyzer port and using a probing horn antenna to collect data.
4. Using another standard gain horn antenna to calibrated those data

### 2-5.2 Chamber definition



1. An anechoic chamber (7mx4mx3m) which satisfied far-field condition was applied to avoid multi-path effect
2. The quiet room region is 40cmx40cmx40cm at the center of rotator
3. The distance between DUT and standard antenna is 4.38 m
4. Probing antenna (9120D horn antenna) and standard gain horn antenna (BBHA9120 LPF 600MHz ~6GHz)
- 5.


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## 2-5-3 Efficiency and Gain/


### 4G Main antenna

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
820	30.44	-5.16	-1.6
830	32.01	-4.95	-0.15
840	31.87	-4.97	0.63
850	32.75	-4.85	1.69
860	38.12	-4.19	2.79
870	33.41	-5.17	0.11
880	48.72	-3.12	3.66
890	51.19	-2.13	4.87
900	56.42	-2.49	4.81
910	40.94	-3.88	3.49
920	37.51	-5.61	1.71
930	27.44	-7.58	-0.63
940	30.68	-8.05	-1.53
950	32.66	-8.98	-3.41

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
1710	41.23	-3.85	1.85
1720	37.73	-4.23	1.59
1730	37.89	-4.21	1.4
1740	43.7	-4.72	1.23
1750	41.33	-3.84	1.92
1760	36.71	-4.35	1.5
1770	45.91	-3.38	2.38
1780	50.07	-3	2.69
1790	55.72	-2.54	3.34
1800	69.88	-1.56	4.62
1810	60.76	-2.16	4.09
1820	59.9	-2.23	3.43
1830	56.44	-2.48	3.28
1840	49.95	-3.01	2.68

UNLESS OTHER SPECIFIED TOLERANCES ON : <b>X=±</b> <b>X.X=±</b> <b>X.XX=±</b> <b>ANGLES=±</b> <b>HOLEDIA=±</b>			<b>KINGRF TECHNOLOGY CO., LTD.</b>
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Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
1850	53.32	-2.73	3.95	2170	39.48	-4.04	1.84
1860	48.7	-3.13	3.28	2180	43.67	-4.73	0.83
1870	45.82	-3.39	3.01	2190	38.65	-4.13	1.25
1880	43.79	-3.59	2.51	2200	42.26	-4.91	0.08
1890	41.97	-3.77	2.5	2210	41.38	-3.83	0.58
1900	40.13	-3.97	1.99	2220	44.76	-4.59	0.54
1910	62.49	-2.04	3.41	2230	47.18	-3.26	1.25
1920	64.36	-1.91	3.3	2240	41.84	-3.78	1.5
1930	75.29	-1.23	3.8	2250	45.32	-3.44	1.46
1940	76.91	-1.14	3.63	2260	49.66	-3.04	1.44
1950	61.76	-2.09	2.62	2270	42.64	-3.7	0.92
1960	65.53	-1.84	2.82	2280	45.13	-3.46	1.1
1970	51	-2.92	1.74	2290	43.47	-4.75	0.05
1980	67.53	-1.7	3.46	2300	44.32	-4.64	0.57
1990	51.02	-2.92	2.2	2310	47.5	-5.61	0.51
2000	54.15	-2.66	2.56	2320	46.44	-4.38	1.27
2010	37.29	-4.28	1.08	2330	45.92	-4.45	1.05
2020	45.37	-3.43	2.37	2340	41.94	-3.77	1.17
2030	48.79	-3.12	2.38	2350	43.15	-3.65	0.93
2040	43.94	-3.57	1.64	2360	44.47	-3.52	0.63
2050	45.28	-3.44	1.46	2370	41.26	-3.84	0.12
2060	40.22	-5.2	0.74	2380	41.86	-3.78	0.04
2070	44.79	-4.59	0.93	2390	44.71	-4.6	0.23
2080	44.61	-4.61	0.02	2400	48.32	-3.16	2.62
2090	45.25	-4.53	0.05	2410	59.79	-2.23	4.23
2100	46.26	-4.41	0.7	2420	44.42	-3.52	3.32
2110	46.67	-3.31	1.78	2430	42.16	-3.75	2.23
2120	45.83	-4.22	1.14	2440	39.66	-4.02	0.94
2130	41.98	-3.77	1.49	2450	42.26	-3.74	1.32
2140	40.36	-3.94	1.37	2460	56.45	-2.48	2.46
2150	38.52	-4.14	1.01	2470	51.46	-2.89	1.58
2160	44.11	-4.67	0.69	2480	63.99	-1.94	2.38

UNLESS OTHER SPECIFIED TOLERANCES ON : <b>X=±</b> <b>X.X=±</b> <b>X.XX=±</b> <b>ANGLES=±</b> <b>HOLEDIA=±</b>		 <b>KINGRF TECHNOLOGY CO., LTD.</b>
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Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2490	67.63	-1.7	2.24
2500	61.09	-2.14	1.61
2510	40.31	-3.95	0.2
2520	43.4	-4.76	0.47
2530	45.6	-4.49	0.35
2540	43.45	-4.76	0.62
2550	39.68	-5.27	0.27
2560	41.98	-6.58	0.13
2570	39.57	-5.29	0.28
2580	44.79	-6.06	0.88
2590	46.29	-5.8	0.78

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2600	45.12	-6	0.51
2610	41.41	-6.69	1.13
2620	42.44	-4.89	0.54
2630	37.12	-5.67	0.83
2640	38.87	-5.4	0.27
2650	46.32	-5.8	2.17
2660	45.69	-4.47	0.83
2670	44.81	-4.58	0.39
2680	39.74	-5.27	0.46
2690	38.29	-5.48	-0.17


#### 4G Diversity antenna

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
1710	57.18	-2.43	1.99
1720	59.27	-2.27	2.55
1730	55.43	-2.56	2.89
1740	65.94	-1.81	4.37
1750	56.88	-2.45	2.57
1760	50.39	-2.98	2.36
1770	54.28	-2.65	2.56
1780	75.45	-1.22	4.12
1790	69.76	-1.56	3.64

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
1800	59.43	-2.26	2.98
1810	52.35	-2.81	2.45
1820	41.12	-3.86	1.22
1830	52.28	-2.82	2.26
1840	38.92	-4.1	1.05
1850	52.09	-2.83	2.12
1860	55.09	-2.59	2.4
1870	63.88	-1.95	3.83
1880	67.91	-1.68	4.33

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Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
1890	67.64	-1.7	3.88	2200	38.96	-4.09	1.12
1900	72.56	-1.39	3.74	2210	44.67	-3.5	2.1
1910	80.84	-0.92	4.03	2220	41.34	-3.84	2.16
1920	81.24	-0.9	3.82	2230	51.51	-2.88	3.35
1930	64.39	-1.91	3.42	2240	46.85	-3.29	3.14
1940	66.57	-1.77	3.54	2250	46.67	-3.31	3.26
1950	58.94	-2.3	3.14	2260	42.54	-3.71	2.57
1960	59.21	-2.28	3.32	2270	45.92	-3.38	2.77
1970	56.75	-2.46	2.77	2280	48.32	-3.16	2.73
1980	69.08	-1.61	3.5	2290	44.08	-3.56	2.11
1990	73.6	-1.33	3.73	2300	40.13	-3.97	1.17
2000	71.49	-1.46	3.38	2310	31.44	-5.03	-0.2
2010	49.21	-3.08	1.45	2320	38.41	-4.16	1.06
2020	47.61	-3.22	1.71	2330	38.13	-5.51	0.05
2030	50.67	-2.95	2.21	2340	41.76	-4.98	1.02
2040	46.76	-3.3	1.9	2350	37.28	-5.64	0.38
2050	48.56	-3.14	2.07	2360	44.61	-4.61	1.26
2060	41.39	-3.83	1.9	2370	36.37	-4.39	0.89
2070	43.19	-3.65	2.01	2380	38.02	-4.2	0.74
2080	56.07	-2.51	3.17	2390	44.02	-4.68	0.09
2090	50.69	-2.95	2.22	2400	44.21	-3.55	1.06
2100	51.58	-2.88	2.43	2410	61.4	-2.12	3.55
2110	62.88	-2.01	3.03	2420	39.27	-4.06	2.3
2120	44.2	-3.55	1.45	2430	41.64	-3.8	2.25
2130	51.98	-2.84	2.16	2440	42.11	-4.93	0.73
2140	39.81	-4	1.31	2450	38.09	-4.19	0.72
2150	42.36	-3.73	2.2	2460	44.19	-3.55	0.94
2160	36.61	-4.36	1.43	2470	36.29	-4.4	0.05
2170	46.29	-3.35	2.14	2480	50.63	-2.96	1.71
2180	39.54	-4.03	0.75	2490	52.14	-2.83	2.13
2190	42.65	-3.7	1.63	2500	59.9	-2.23	2.99


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Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2510	43.31	-4.77	0.59
2520	41.04	-5.08	0.4
2530	44.57	-4.61	0.74
2540	47.23	-4.29	1.44
2550	44.84	-4.58	0.92
2560	38.98	-5.38	0.26
2570	40.08	-3.97	2
2580	45.66	-4.48	1.36
2590	46.79	-4.34	1.34
2600	44.2	-4.66	1.03

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2610	41.6	-5	0.75
2620	45.67	-4.48	1.54
2630	44.36	-4.64	1.49
2640	39.76	-5.26	0.61
2650	36.04	-5.84	0.41
2660	43.47	-4.75	1.24
2670	40.43	-5.17	0.91
2680	39.03	-5.37	0.65
2690	43.32	-5.63	0.27

### WIFI antenna

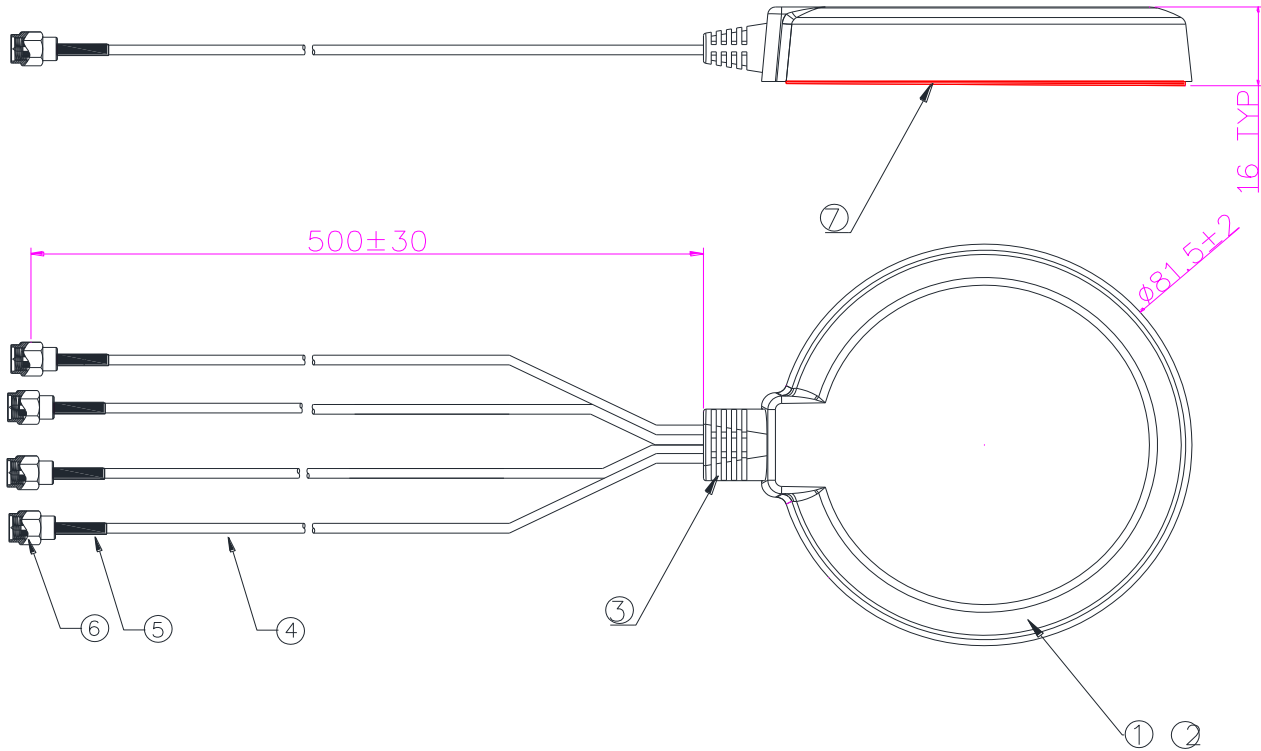
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	57.48	-2.4	1.73
2410	78.46	-1.05	3.56
2420	62.21	-2.06	2.48
2430	68.25	-1.66	2.75
2440	59.82	-2.23	2.05
2450	65.08	-1.87	2.77
2460	70.08	-1.54	3.24
2470	67.74	-1.69	3.39
2480	67.95	-1.68	3.66
2490	69.77	-1.56	4.05
2500	54.27	-2.65	3.31

UNLESS OTHER SPECIFIED TOLERANCES ON : <b>X=±</b> <b>X.X=±</b> <b>X.XX=±</b> <b>ANGLES=±</b> <b>HOLEDIA=±</b>		 <b>KINGRF TECHNOLOGY CO., LTD.</b>
<b>SCALE :</b>	<b>UNIT : mm</b>	
<b>DRAWN BY: LI</b>	<b>CHECKED BY: YS</b>	THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF KINGRF TECHNOLOGY CO.,LTD.AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION
<b>DESIGNED BY: De wen</b>	<b>APPROVED BY: YS</b>	
<b>TITLE: WX.0022.L4.GAS 4G/GNSS/WIFI ANTENNA Specification</b>		<b>SPEC REV.</b> <b>P0</b>

### 3. Mechanical Specification:

#### 3-1. Mechanical Configuration (Unit: mm)

The appearance of the antenna is according to drawing



⑧	下盖	外壳下盖 黑色	1	PCS
⑦	3M	3M双面胶 红色离型纸 厚1 mm	1	PCS
⑥	接头	SMA公头公针 镀金	4	PCS
⑤	热缩套管	热缩套管 带频段印字	4	PCS
④	线材	RG174黑色线材 L=500	4	PCS
③	SR	SR黑色束线扣 四出线	1	PCS
②	PCB	RF4 绿色油墨白色字码	1	PCS
①	上壳	圆形黑色上盖 $\phi 81.5$	1	PCS
ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	QTY REQD	UNIT

#### PARTS LIST

UNLESS OTHER SPECIFIED TOLERANCES ON : $X = \pm$ $X.X = \pm$ $X.XX = \pm$ ANGLES = $\pm$ HOLEDIA = $\pm$			<b>KINGRF TECHNOLOGY CO., LTD.</b>
SCALE :	UNIT : mm		
DRAWN BY: LI	CHECKED BY: YS		
DESIGNED BY: De wen	APPROVED BY: YS		
TITLE: WX.0022.L4.GAS 4G/GNSS/WIFI ANTENNA Specification			SPEC REV. P0



### 3-2. Connector appearance: SMA PLUG



### 3-3.Product Image:



UNLESS OTHER SPECIFIED TOLERANCES ON : $X = \pm$ $X.X = \pm$ $X.XX = \pm$ <b>ANGLES</b> = $\pm$ <b>HOLEDIA</b> = $\pm$			<b>KINGRF TECHNOLOGY CO., LTD.</b>
<b>SCALE :</b>	<b>UNIT : mm</b>		
DRAWN BY: LI	CHECKED BY: YS		
DESIGNED BY: De wen	APPROVED BY: YS		
<b>TITLE: WX.0022.L4.GAS 4G/GNSS/WIFI ANTENNA Specification</b>			<b>SPEC REV.</b> P0



## 4 .Packaging specification:

<b>Product number:</b> xxx			
<b>Product model:</b> xxx			
<b>一、 Label requirements:</b>			
<b>Customer</b>	xxx		
<b>supplier</b>	xxxxx		
<b>Material coding</b>	xx		
<b>Product model</b>	xx		
<b>Number</b>	XXX PCS	<b>Factory date</b>	X X X
<b>Remarks</b>			
<b>二、 Boxing:</b>			
<b>Job description:</b>			
<b>1. Inner packaging:</b>			
XXpcs A bag			
<b>2. External packaging:</b>			
Xx PCS ;			
<b>3. Matters needing attention:</b>			
a. Whether to add partition and pearl cotton;			
b. Label attachments, such as ROHS, etc.;			

PE 袋

纸箱

UNLESS OTHER SPECIFIED TOLERANCES ON : $X = \pm$ $X.X = \pm$ $X.XX = \pm$ <b>ANGLES</b> = $\pm$ <b>HOLEDIA</b> = $\pm$			<b>KINGRF TECHNOLOGY CO., LTD.</b>
<b>SCALE :</b>	<b>UNIT : mm</b>	THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF KINGRF TECHNOLOGY CO.,LTD.AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION	
<b>DRAWN BY:</b> LI	<b>CHECKED BY:</b> YS		
<b>DESIGNED BY:</b> De wen	<b>APPROVED BY:</b> YS		
<b>TITLE:</b> WX.0022.L4.GAS 4G/GNSS/WIFI ANTENNA Specification			<b>SPEC REV.</b> P0