APPROVAL SHEET

External antenna

OnePlusOne :

Project:	External antenna		
RF Check		QC Check	
ME Check		Confirm By	

Customer: Dragino Technology

Project:	External antenna		
EE Check		QC Check	
PM Check		Confirm By	

Date:	Revision:	Updates and changes:	Issued by:
2016-11-2	A	Initial sheet	Dabin.Zhu

Contents

1 Antenna description

It summarizes External antenna for project External antenna-R/L. External antenna antenna's frequency band is 868-930MHz. External antenna's type is Monopole.

1.1 Part number

Part number of antenna：External antenna-R/External antenna-L

1.2 Antenna pictures

2 Electrical Performance

2.1 Specification

External antenna	
Frequency Range	868MHz~930MHz
Return Loss	<-5
Efficiency	>35%

2.2 Measurement Set-up

2.2.1 VSWR and Return Loss

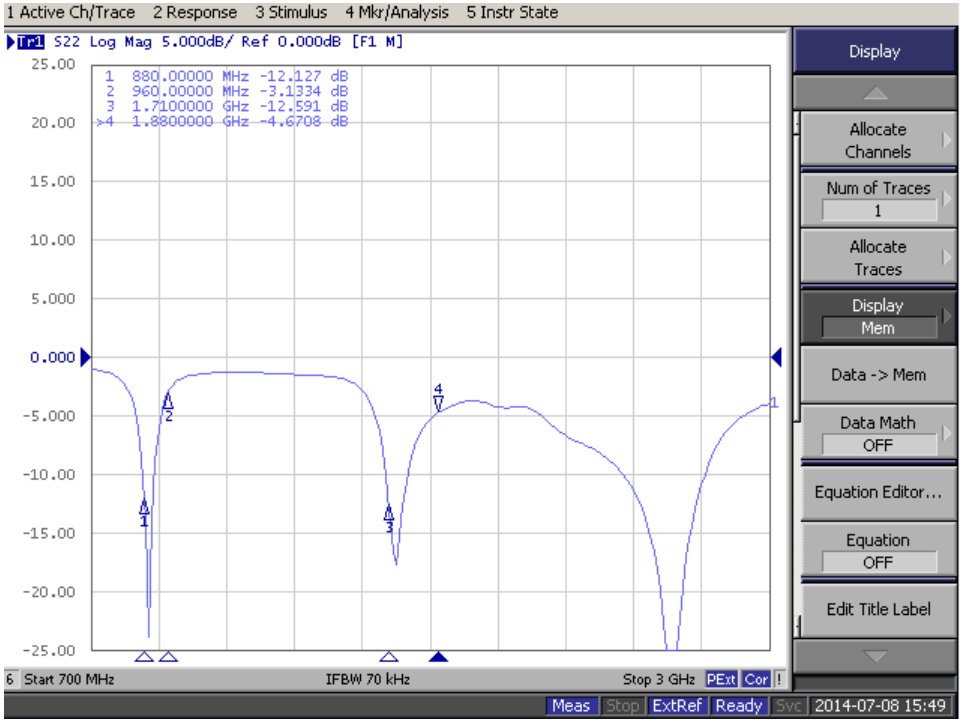
VSWR measurements (S_{11}) were performed using an Agilent ENA series Network Analyzer and the previously described test fixture. Coaxial chokes were used to mitigate surface currents on the outside of the cabling. The testing was performed in free space.

2.2.2 Efficiency and Gain

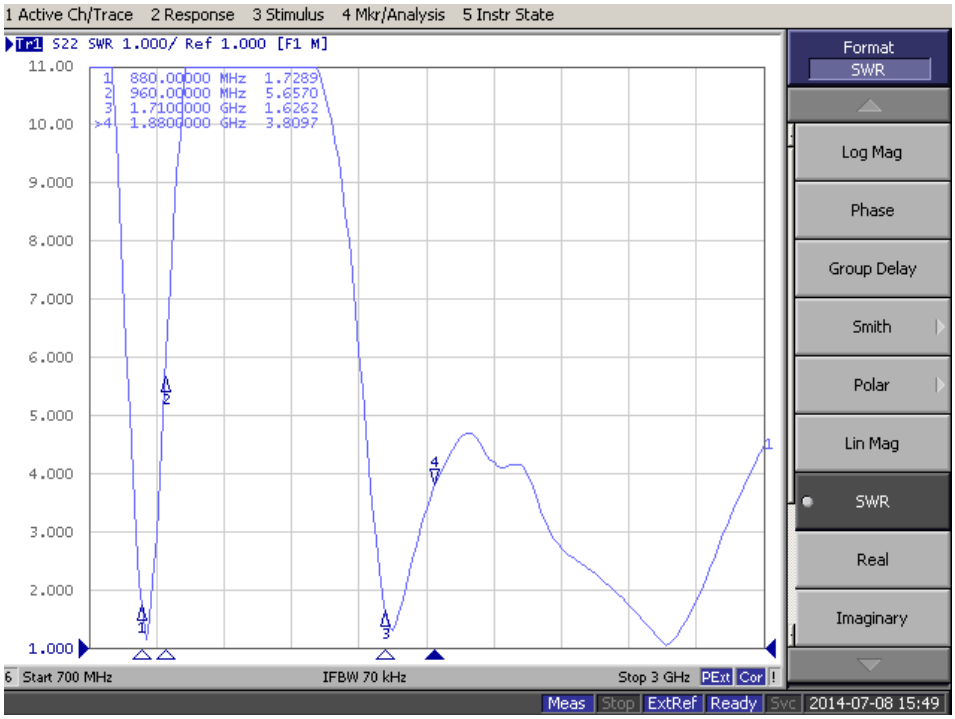
The gain of the antenna was measured in OPO's 3D anechoic chamber in Shenzhen, China. The chamber is a ETS system capable of doing tests from 380MHz to 6GHz. Coaxial chokes on the feed cable were used to mitigate surface currents during passive tests. The measurement results are calibrated using dipole standards. For TRP and TIS the chamber uses a 8960 / MT8820C to establish the connection with the mobile device and read the power.

3 Reference measurement data

3.1 Passive - External antenna



External antenna-RL



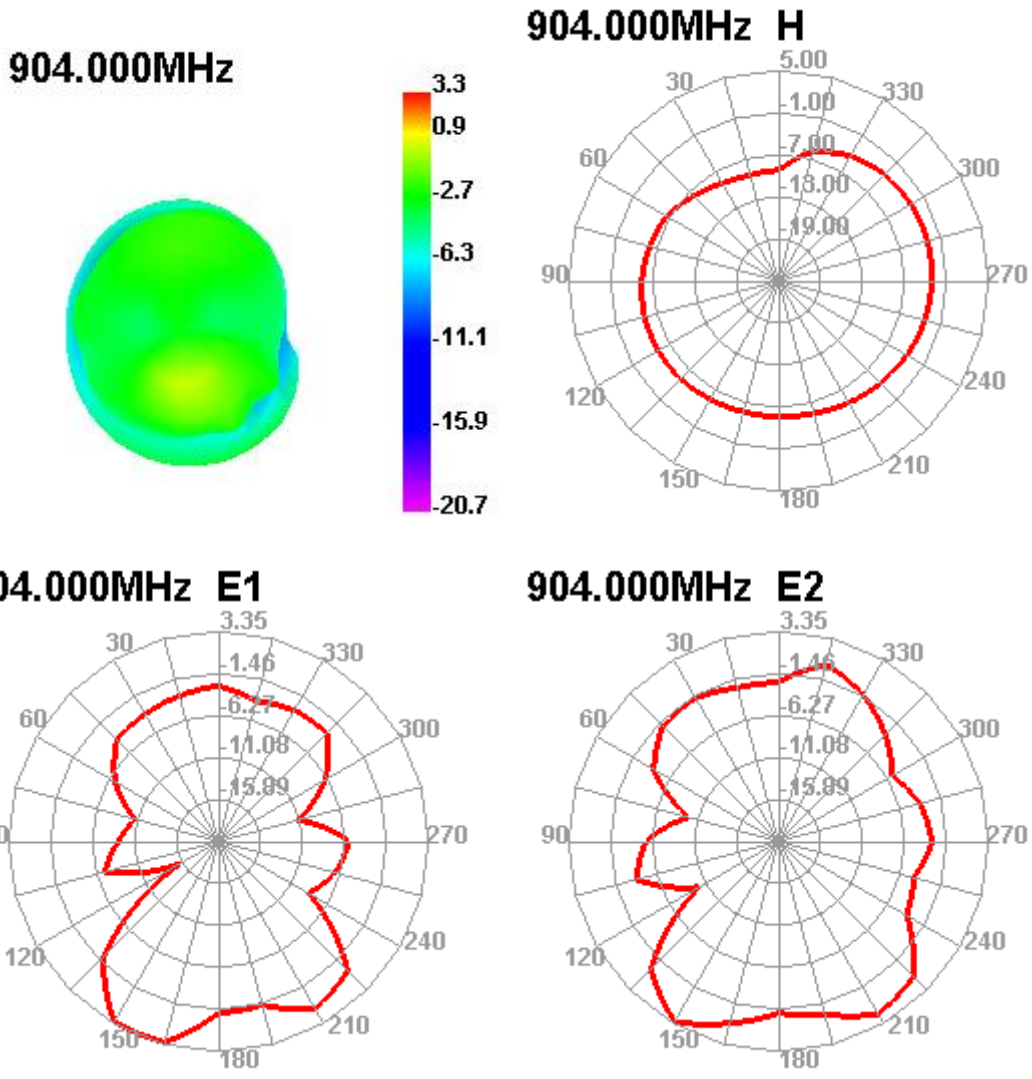
External antenna- VSWR

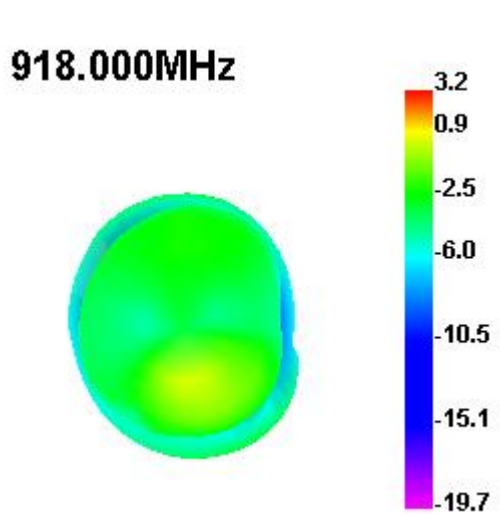
3.2 Matching Circuit description

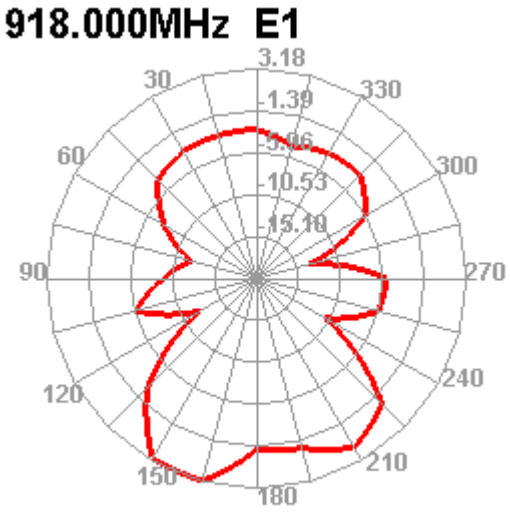
3.3 Passive-EFF

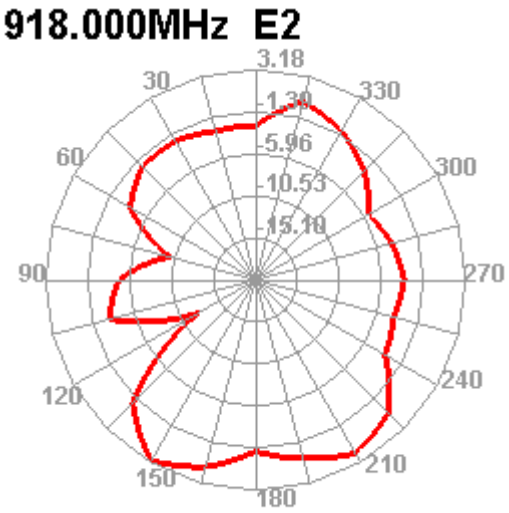
Freq (MHz)	Effi (%)	Gain (dBi)
868	51.76	3.43
904	50.42	3.35
918	49.68	3.18
922.5	49.64	2.69

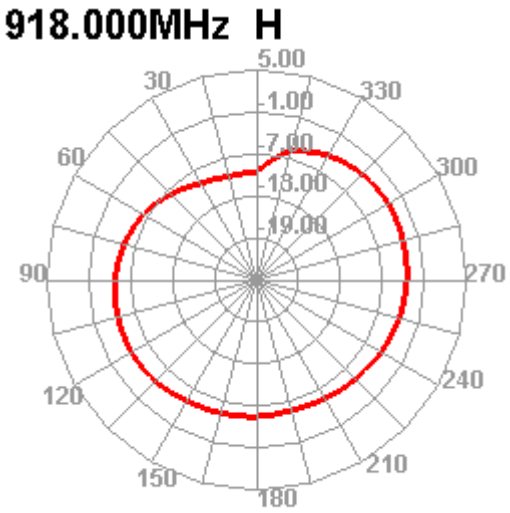
3.4 Radiated pattern




918.000MHz
3.2
0.9
-2.5
-6.0
-10.5
-15.1
-19.7


918.000MHz E1
3.18
-1.39
-5.96
-10.53
-15.10
30
330
60
300
90
270
120
240
150
210
180


918.000MHz E2
3.18
-1.39
-5.96
-10.53
-15.10
30
330
60
300
90
270
120
240
150
210
180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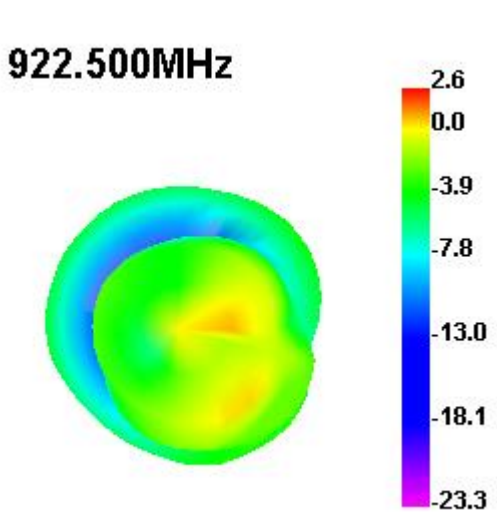
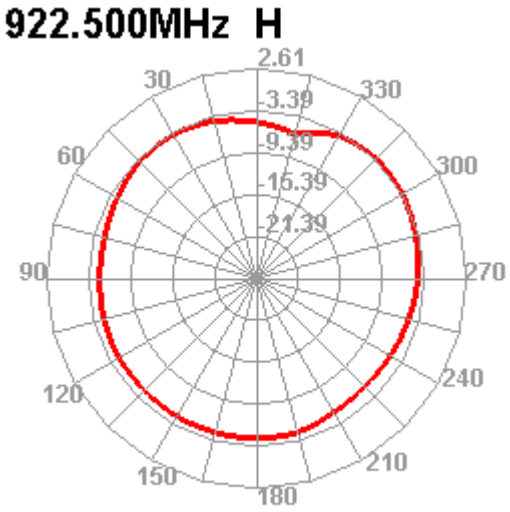
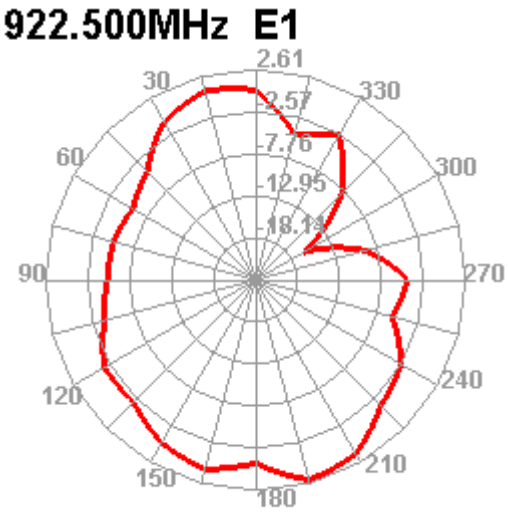
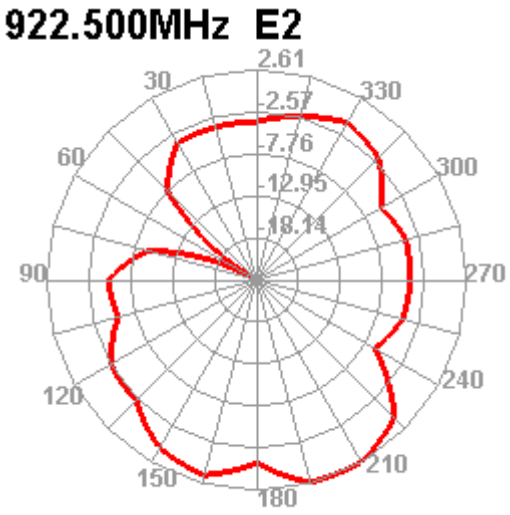
5.00
-1.00
-7.00
-13.00
-19.00
30
330
60
300
90
270
120
240
150
210
180


922.500MHz
2.6
0.0
-3.9
-7.8
-13.0
-18.1
-23.3


922.500MHz H
2.61
-3.39
-9.39
-15.39
-21.39
30
330
60
300
90
270
120
240
150
210
180


922.500MHz E1
2.61
-2.57
-7.76
-12.95
-18.14
30
330
60
300
90
270
120
240
150
210
180


922.500MHz E2
2.61
-2.57
-7.76
-12.95
-18.14
30
330
60
300
90
270
120
240
150
210
180