**测试环境：高19m 宽31m 面积589平方米 信号区域300平方米**



**测试结果：在该地图下，满足覆盖率和最大质问区分度的AP的个数一般为三个，质问区分度最好能达到-4.937。但是偶尔出现AP个数为2个和4个的时候，AP个数越多，质问区分度也越好。**

**测试1**

initial AP deployment:

AP1:6,12

AP2:11,22

AP3:11,2

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 & 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-5.7315017300873885

updating AP fingerprint:-5.2976467597446195

updating AP fingerprint:-4.937233692526135

Max fingerprint: -4.937233692526135

AP1:7,15

AP2:11,25

AP3:11,6

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 & 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

**测试2**

initial AP deployment:

AP1:6,20

AP2:11,10

AP3:17,21

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 & 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 & 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-6.005743486609342

updating AP fingerprint:-5.0839183256742775

updating AP fingerprint:-5.079162358355658

Max fingerprint: -5.079162358355658

AP1:5,20

AP2:8,8

AP3:16,21

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 & 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 & 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

**测试3**

initial AP deployment:

AP1:11,24

AP2:7,12

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 & 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-6.33912849296558

updating AP fingerprint:-5.829223088004948

updating AP fingerprint:-5.733660130864914

updating AP fingerprint:-5.694796122492159

Max fingerprint: -5.694796122492159

AP1:11,23

AP2:8,9

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

**测试4**

initial AP deployment:

AP1:8,9

AP2:7,20

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 & 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-6.492159695572201

updating AP fingerprint:-5.7726813737575995

updating AP fingerprint:-5.430630964037158

Max fingerprint: -5.430630964037158

AP1:11,9

AP2:8,23

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

**测试5**

initial AP deployment:

AP1:13,16

AP2:3,10

AP3:8,26

AP4:11,2

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 & 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 & 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-6.928831769419736

updating AP fingerprint:-3.7334245450483357

Max fingerprint: -3.7334245450483357

AP1:12,16

AP2:2,13

AP3:10,26

AP4:8,4

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 & 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 & 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

**测试6**

initial AP deployment:

AP1:11,5

AP2:11,18

AP3:8,29

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-5.849627454337986

updating AP fingerprint:-5.001826135518067

Max fingerprint: -5.001826135518067

AP1:8,7

AP2:12,17

AP3:8,26

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 & 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

**测试7**

initial AP deployment:

AP1:17,21

AP2:8,12

AP3:8,28

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 & 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-6.333004836909776

updating AP fingerprint:-5.642929620522923

updating AP fingerprint:-5.167842841445777

updating AP fingerprint:-5.115257792155891

Max fingerprint: -5.115257792155891

AP1:17,15

AP2:6,11

AP3:8,24

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 & 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 & 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

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0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 & 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

**测试8**

initial AP deployment:

AP1:15,22

AP2:7,12

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 & 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 & 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0

initial AP fingerprint:-6.437186402169659

updating AP fingerprint:-5.649664922660971

Max fingerprint: -5.649664922660971

AP1:14,22

AP2:5,10

map width:31 height:19

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 & 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 0

0 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0 0 1

0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1

0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1

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0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 & 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 1 0 0 0 0 0 0 0

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0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0