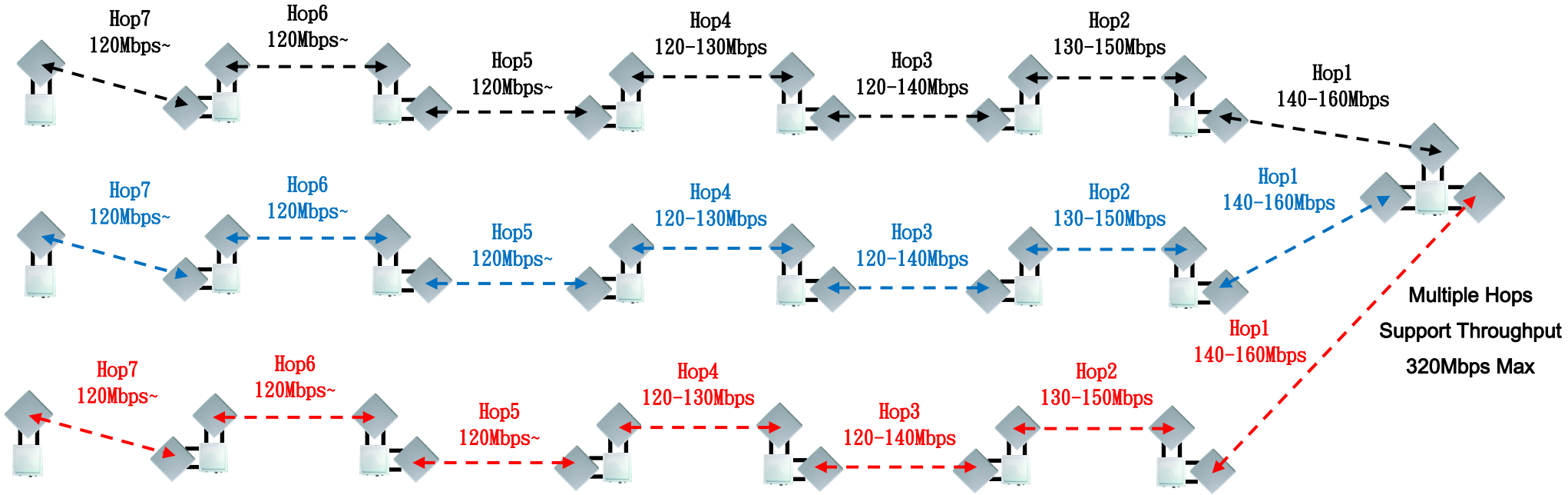
Outdoor Wireless Multiple Hops V.S. Double Bridge & Repeater (Backhaul Dead End)

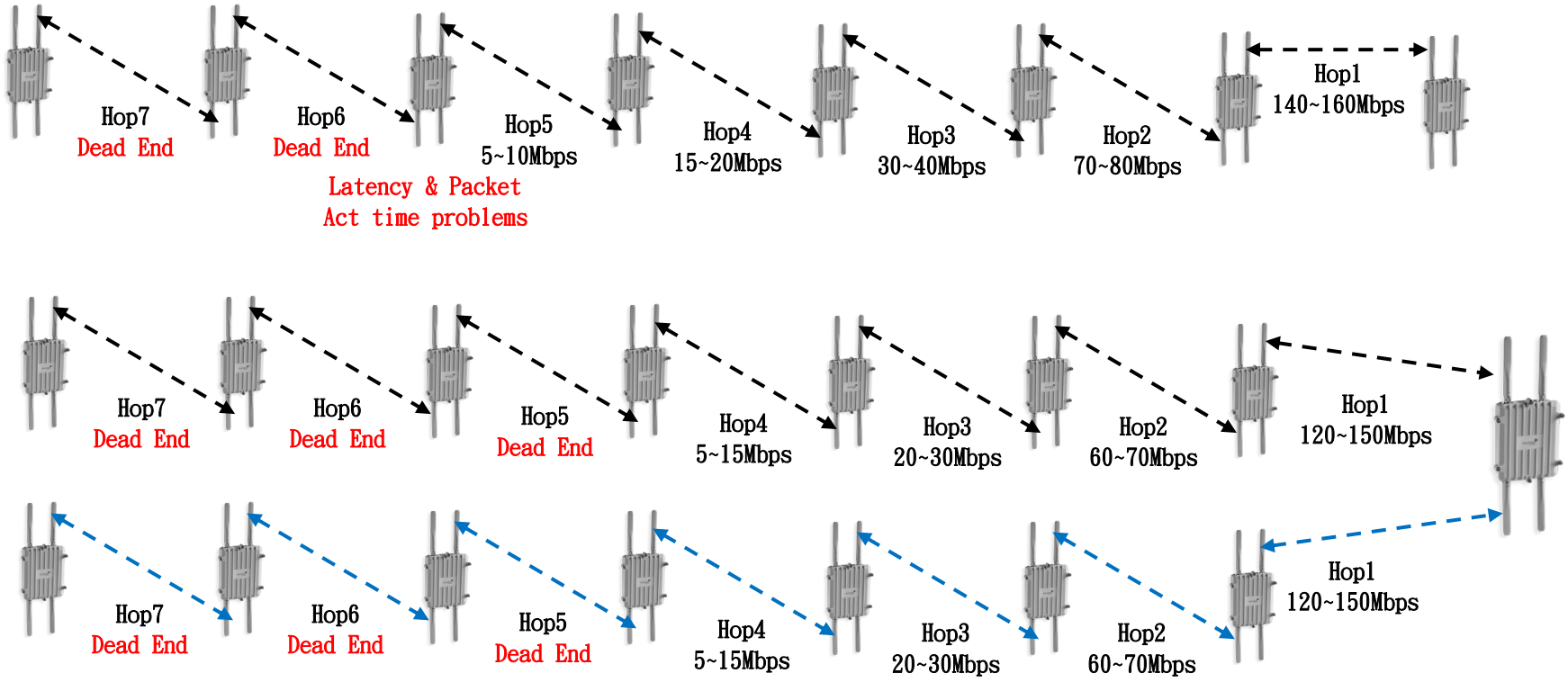
Comprehensive Comparison Tables

IO-Power Outdoor WiFi MIMO Wireless Multiple Hops Backhaul System Structure



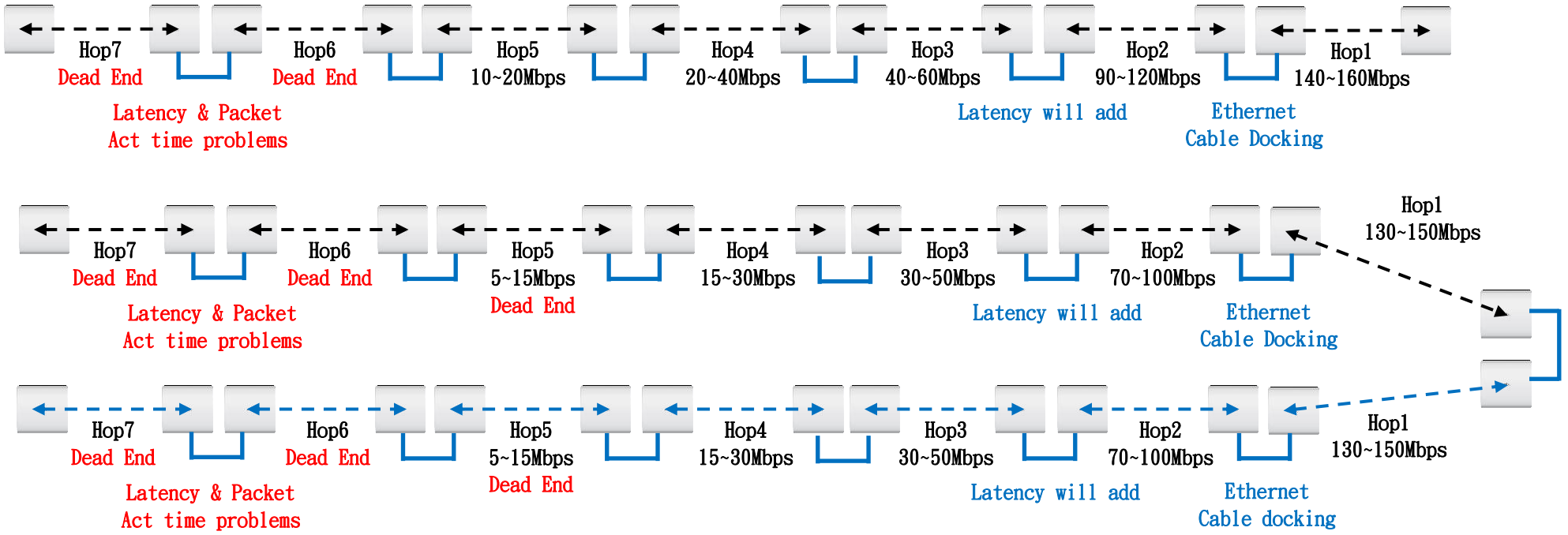
1. Design 2.4GHz & 5.8GHz dual band & 2*2 MIMO Multi three RF modules backhaul system solution.
2. Layer 2 Multiple Hops features and lowest reduce on throughput, even after 5 times hops, it can support 120Mbps~ throughput.
3. Even after 10 times of Hops, the packet latency is under 10ms. It can support special wireless system demand.
4. Each PtP hop distance is more than 5Km, proper for big city or wide area wireless surveillance or long distance 30 Km multi backhaul systems.

General Outdoor WiFi MIMO Wireless Dual RF Module Bridge Backhaul System Structure



1. Dual RF Module Bridge each hop will reduce 1/3~1/2 throughput. After 5 hops, it may cause backhaul dead end.
2. More than 5 times hops will have packet latency and act time issues.
3. When the latency or act time or reduce throughput situation happens, this wireless system will meet backhaul dead end problem.
4. Wireless Hops will add CPU & RAM & RF Module and software management loading, if the outdoor wireless device CPU & RAM …cannot support enough effect, the throughput will reduce more and faster.

General Outdoor WiFi MIMO Wireless Double Bridge Backhaul System Structure

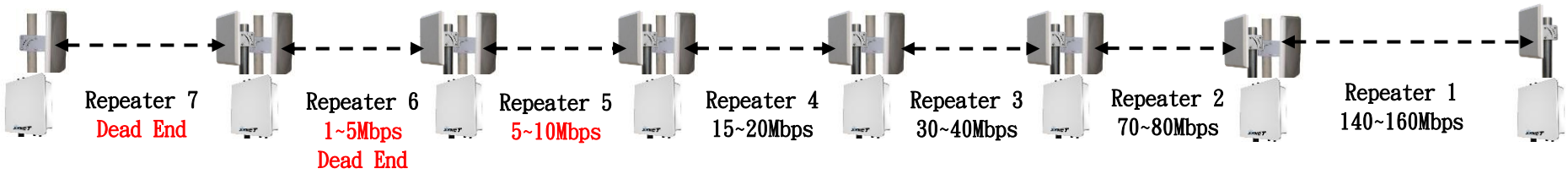


1. Double Bridge each hop will reduce 1/3~1/2 throughput. After 6 hops, it may cause backhaul dead end.
2. More than 4 times hops, it will have packet latency and act time issues. Ethernet Cable Docking sometimes needs another switch to connect two devices, it will add more hops and packet latency and act time, the hops reduce throughput issues will be more serious.
3. When the latency or act time or reduce throughput situation happens, this wireless system will meet backhaul dead end problem.
4. Wireless Hops will add CPU & RAM & RF Module and software management loading, if the outdoor wireless device CPU & RAM…cannot support enough effect, the throughput will reduce more and faster.

General Outdoor WiFi MIMO Wireless AP-WDS Backhaul System Structure

1. AP-WDS is working as AP & AP Client, it is specially extended surf internet backhaul, but the throughput will cut down1/2 in the backhaul because the devices need to transmit AP-throughput and AP Client-throughput, the total throughput will be shared.
2. AP-WDS will have more CPU & RAM …management loading, if the outdoor wireless device CPU & RAM…cannot support enough effect, the throughput will reduce more and faster.
3. When the latency or act time or reduce throughput situation happens, this wireless system will meet backhaul dead end problem.

General Outdoor WiFi MIMO Wireless Repeater Backhaul System Structure



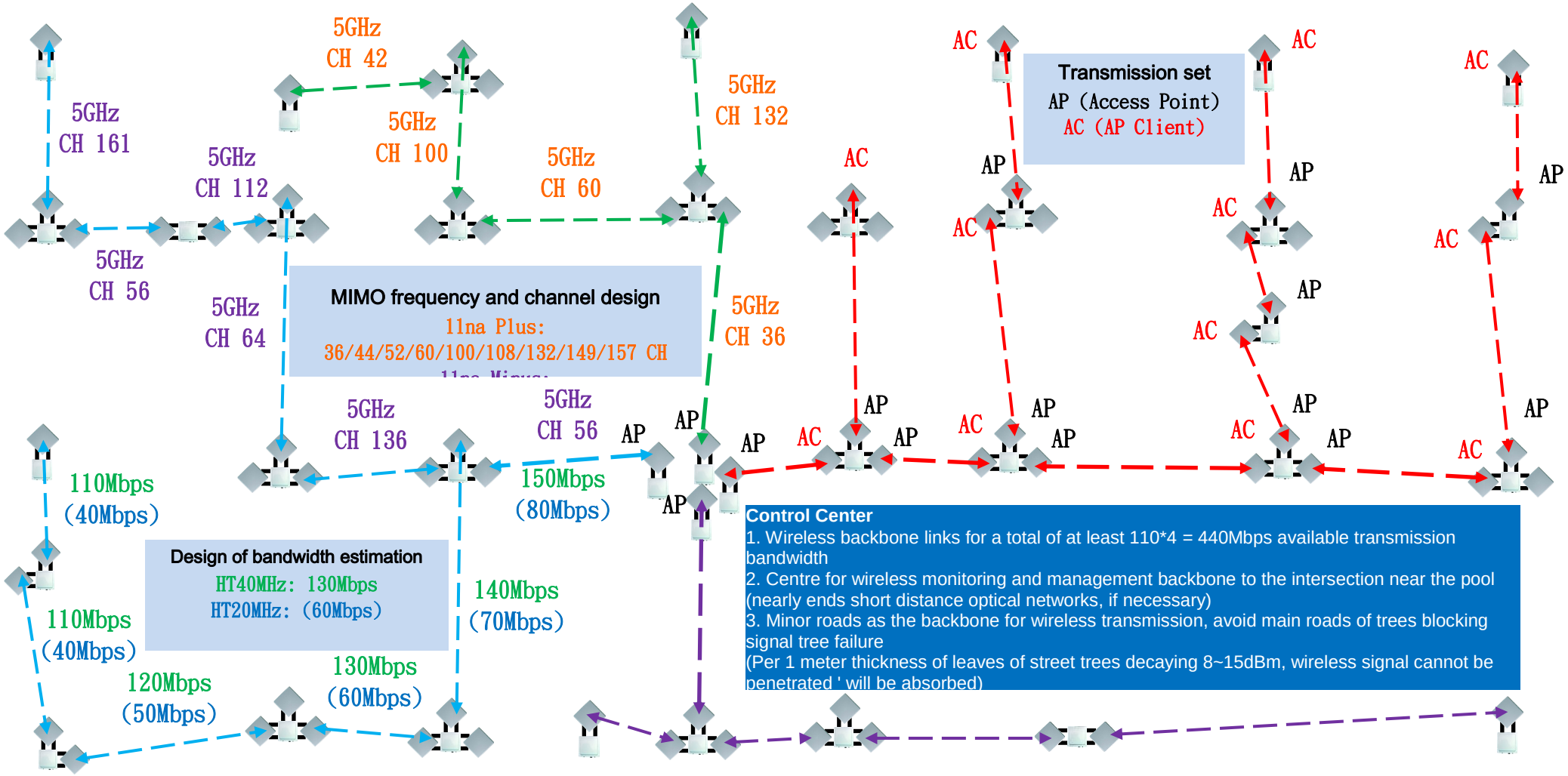
1. Repeater is working as forward transmit, it is specially extended backhaul, but the throughput will reduce 1/2 throughput at each repeater in the backhaul. Even you set up dual radio for wireless repeater system, the throughput will reduce more and faster.
2. When the latency or act time or reduce throughput situation have happens, this wireless system will meet backhaul dead end problem.

Outdoor WiFi MIMO Wireless Multiple Hops Backhaul System Design Case Studies

Case Study 1: City Wide Road Crossroads High Throughput MIMO WiFi Wireless Surveillance System

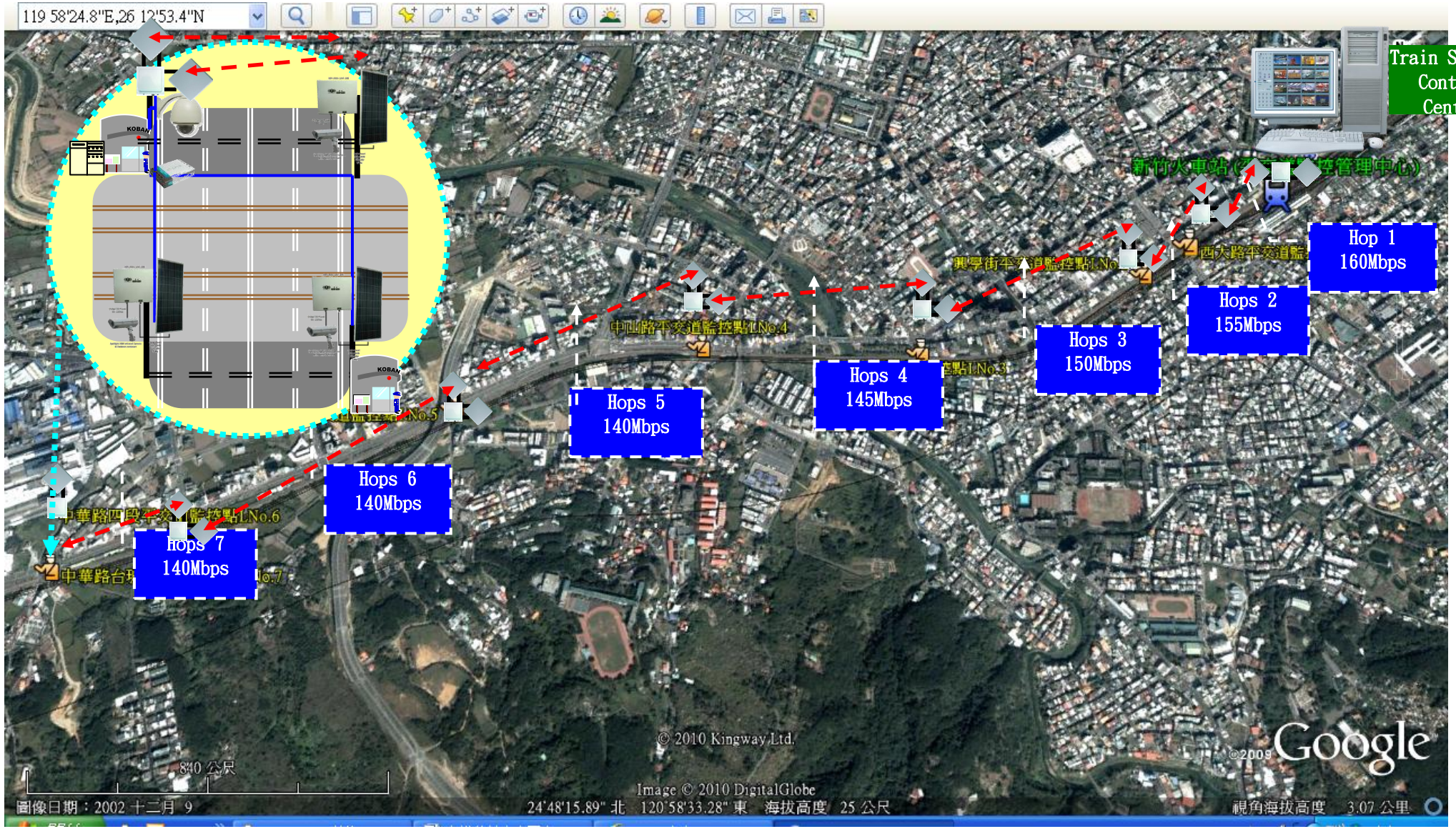
Wireless systems design guide: 1. design of multiple hops relay platform to not more than 6 jumped 2.The basis for the design, each wireless backbone links to no bandwidth over 60Mbps for design requirements 3. In the erection of three forks or crossroads, 103R three wireless module designs, reserved engineering change link direction to set up or increase future links to expand or equipment upgrade needs.

Design 4 Backhaul to provide 4 * 110Mbps = 440Mbps Throughput for Wireless Surveillance System



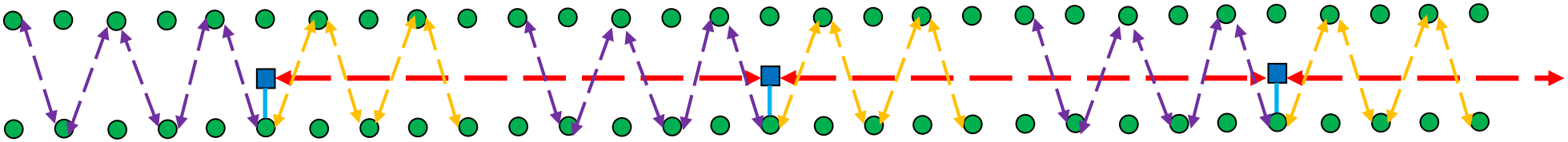
Wireless bandwidth prediction commentary: 1. the multiple hops relay platform technology, 1th hop 140~160Mbps, 2nd hops 130~150Mbps, 3rd hops 120~140Mbps, 4th hops 110~130Mbps, 5th hops after to maintain 110~120Mbps bandwidth, lower bandwidth will not increase the number of platform and response time not less than 10ms.

Case Study 2: Train Station & Train Crossings Multiple Hops Wireless Surveillance System



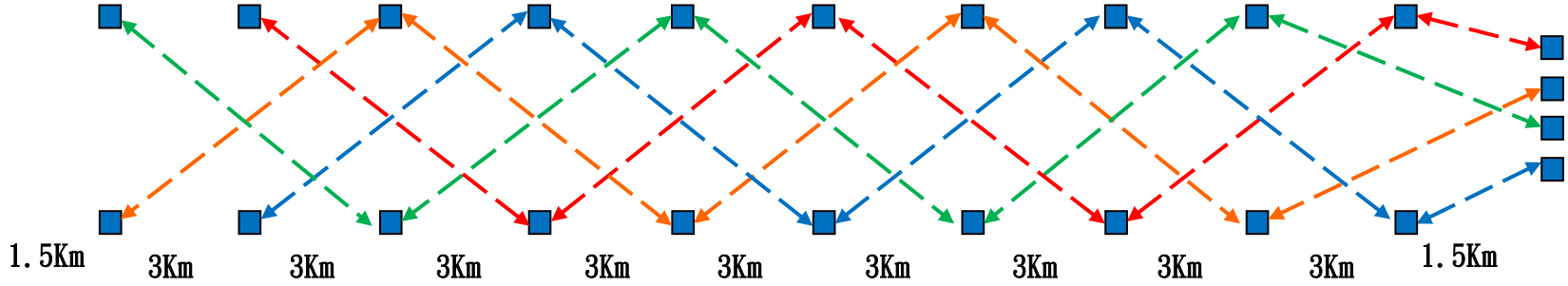
Case Study 3: Design Double Link & Double-decked Backhaul to Provide Upper Level 480Mbps and Lower Level 260Mbps Throughput.

The Lower level repeater hops backhaul
130*2=260Mbps
Two Way Backhaul

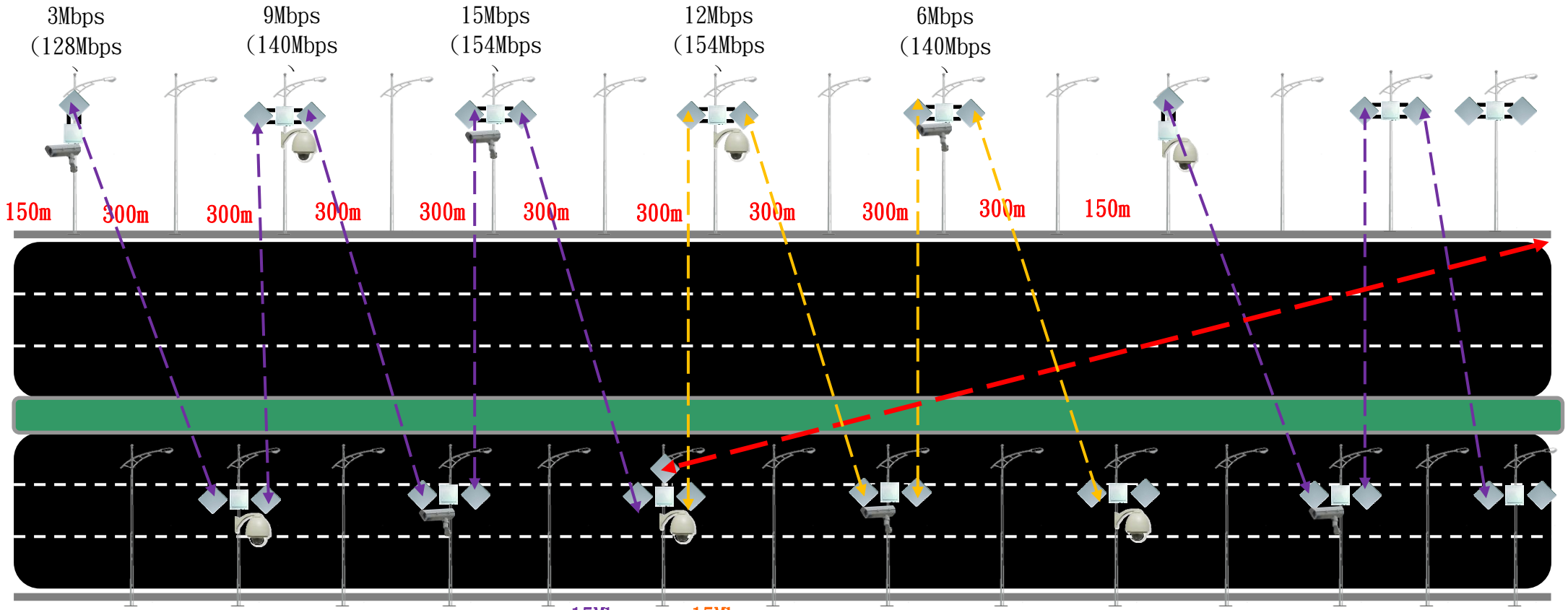


300m*5=1.5Km 300m*10=3Km Total 3Km*9 + 1.5Km*2 = 30Km

The upper level repeater hops backhaul
120*4=480Mbps
Four Backhaul

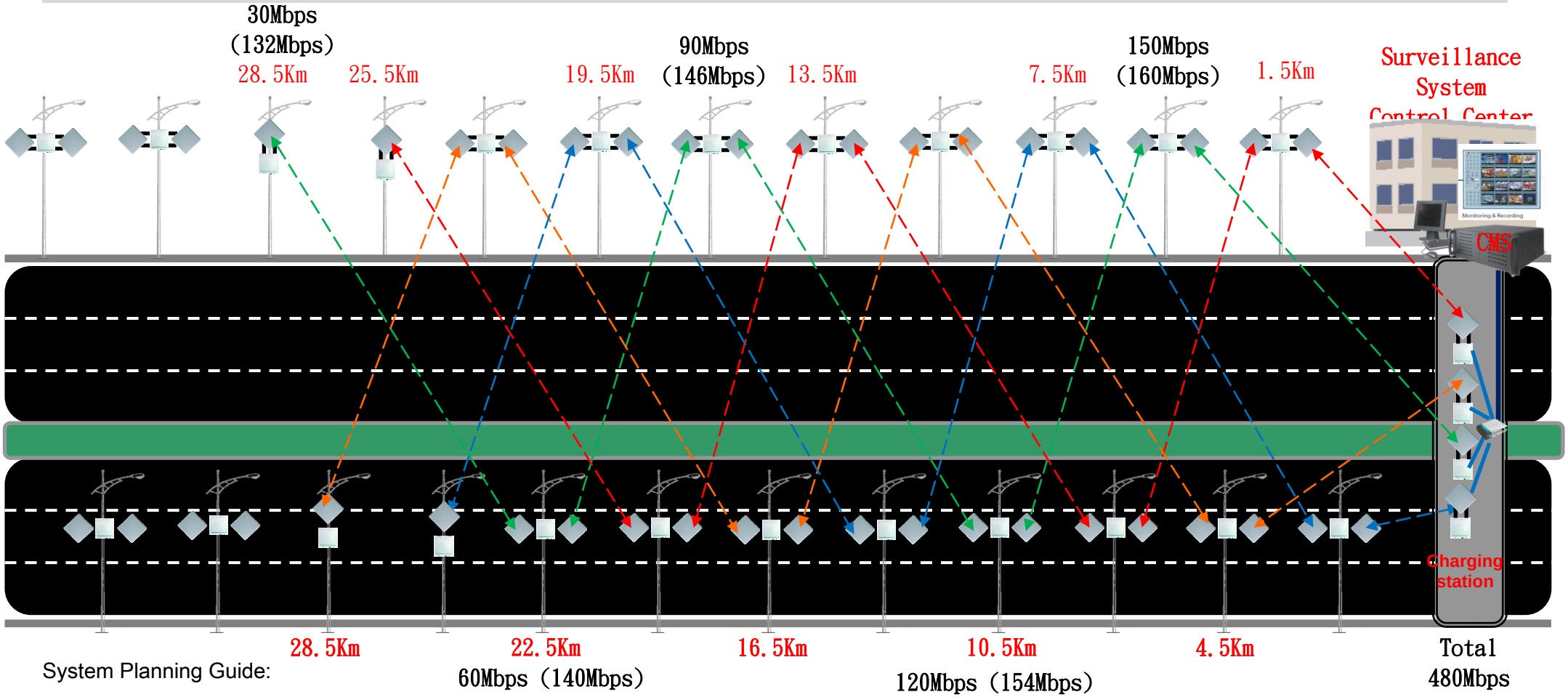


The lower level Multiple Hops: 3Km Throughput 260Mbps for IP Camera * 10 about 30Mbps bandwidth requirement。



(Storage)
Multiple Hops
RF1-5*3=15Mbps (128Mbps)
RF3-5*3=15Mbps (132Mbps)
Backhaul
RF2-10*3=30Mbps (120Mbps)

The upper level Multiple Hops: 30Km Throughput 480Mbps for IP Camera * 100 about 300Mbps bandwidth requirement。



System Planning Guide:

1. Multiple Hops each repeater hop, about 5~8Mbps bandwidth reduction, after the fifth repeater hops, the bandwidth will keep on 120~140Mbps, no longer reduces bandwidth.

2.Upper formation backbone the end each link must withstand 30+30+30+30+30=150Mbps to collect the total bandwidth, the load is very heavy, suggested that the IP Camera bandwidth setup 2Mbps, Speed Dome setup 3Mbps is suitable, which will bring together reduce total bandwidth to 115Mbps.

3. Wireless by straight line transmission primarily, if the highway has the curve area, must additionally build a repeater hop spot in the curve area, or increase or decrease adjustments to two points apart.