

Demonstration experiment of broadband by XGP at railway facilities

April 9th 2010

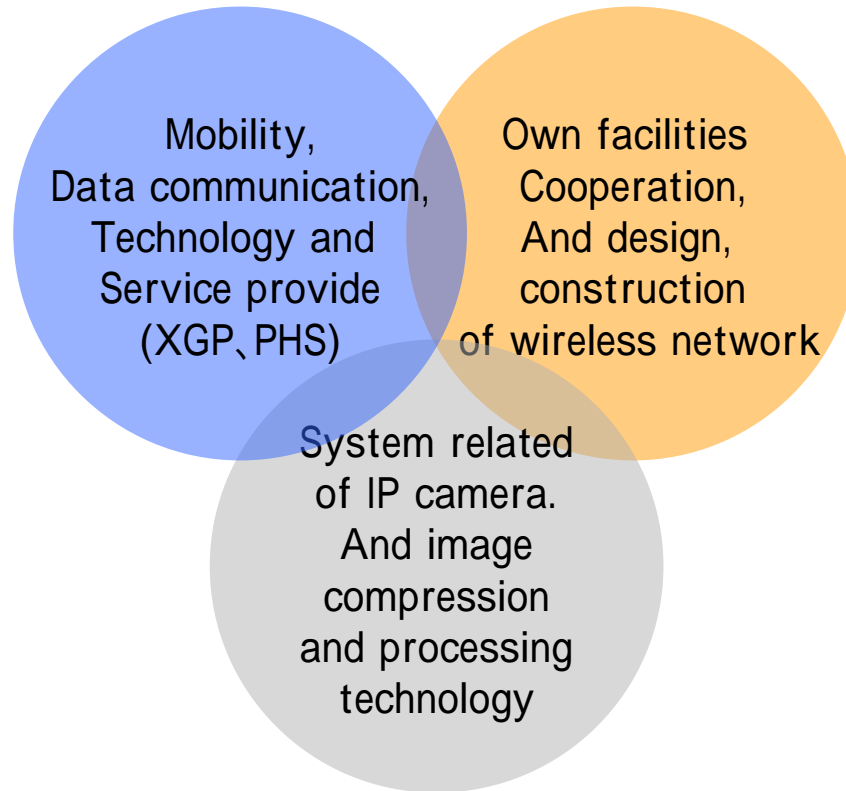
Background and purpose

- The opportunity to use a mobile data communication in the railway has increased. Because the railroad company is positively advancing ICT due to accompanies the development of a wireless technology.
 - An increase in Internet connection by passenger
 - Spreads such as digital signage and surveillance cameras
 - The smart card is greatly widespread. In addition, a new form of use will arise in uniting with broadband.
- The railroad company and the telecommunications operator should jointly do the design and the construction of the base station so that the broadband is used comfortably in the railway facility.
- Then, the Hanshin Electric Railway groups and WILLCOM,Inc jointly executed XGP* proof experiment in the railway place along railway-tracks for the first time in the world for the accumulation of the know how that the providing of the Broadband mobile data communication infrastructure in the railway facilities and the profit use.

* XGP: eXtended Global Platform

Meaning of making a joint experiment

- New approach that unites know-how in each field



**Hanshin Electric Railway
Co., Ltd.**

A lot of manufacturers

Experiment area

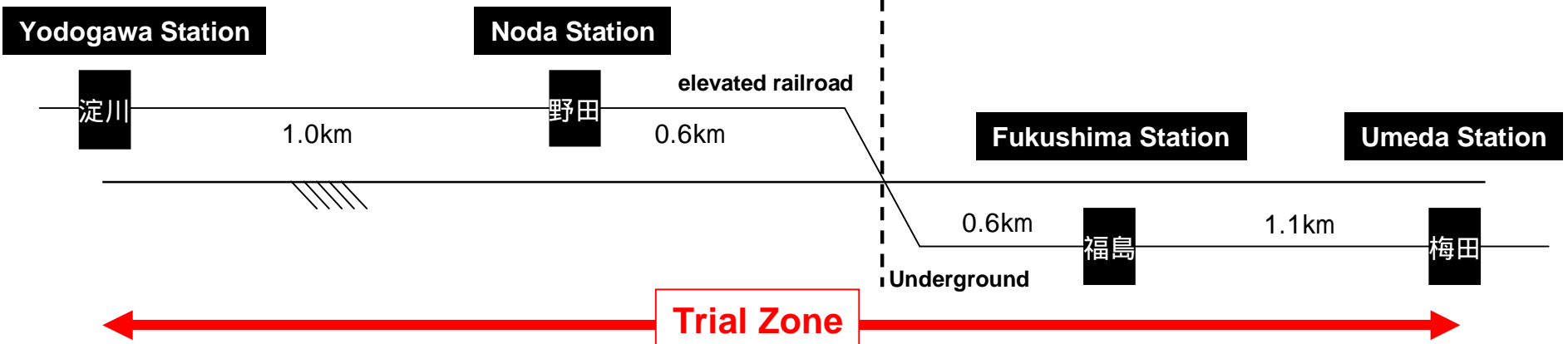
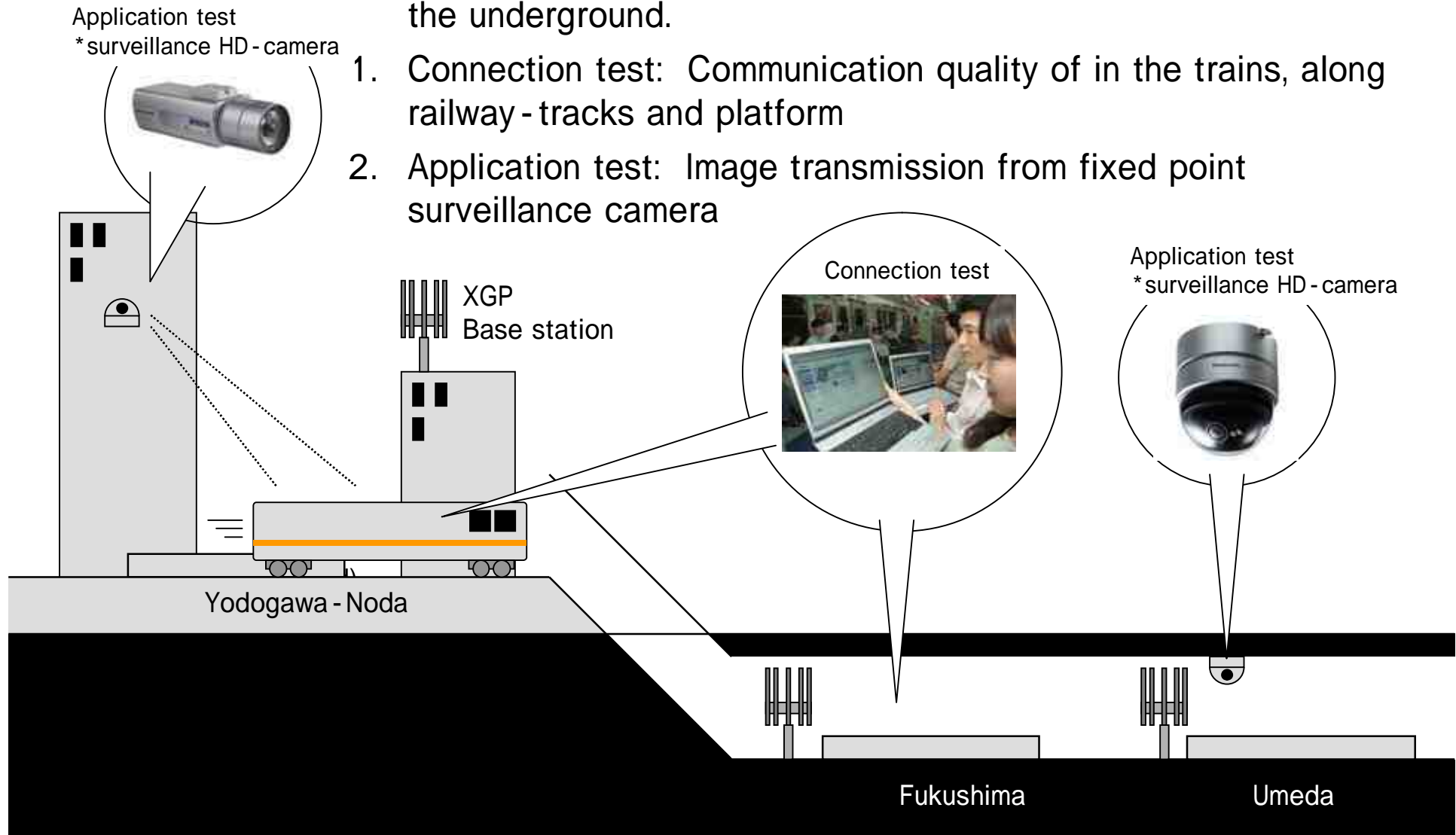


Image of experiment

The trial is done by using the section connected from the ground to the underground.

1. Connection test: Communication quality of in the trains, along railway - tracks and platform
2. Application test: Image transmission from fixed point surveillance camera



Target of experiment

- The theme is selected from the use scene of the main railway business. About Connection test and Application test, a technological target is assumed and verified from railroad company and passenger's viewpoint.

| | Fixed point observation | Mobile observation | Verification measures |
|----------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------|
| Assumed content of service | IP surveillance camera that can be set up anywhere | comfortable Internet connection in train under running | Application test |
| Technical target | Data rate of 5Mbps or more was achieved by the whole area of the trial zone. | Data rate of 2Mbps or more was achieved in running train | Connection test |

XGP base station and IP surveillance camera

Noda BS (public)



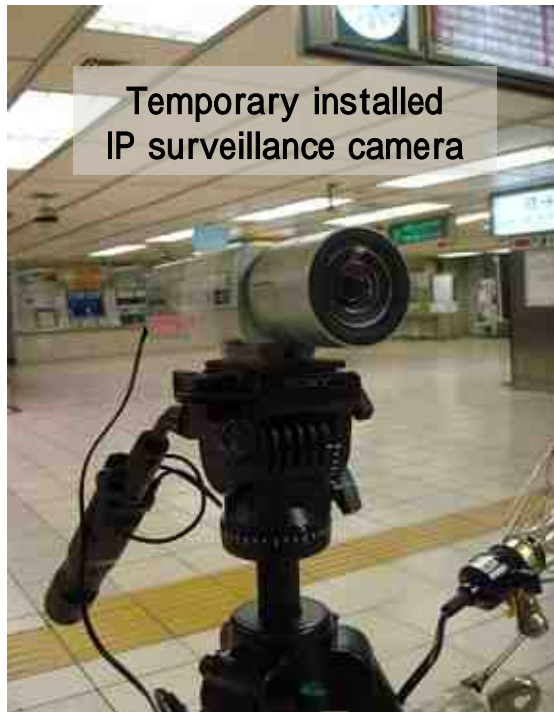
Fukushima BS (temporary)



Umeda BS (temporary)



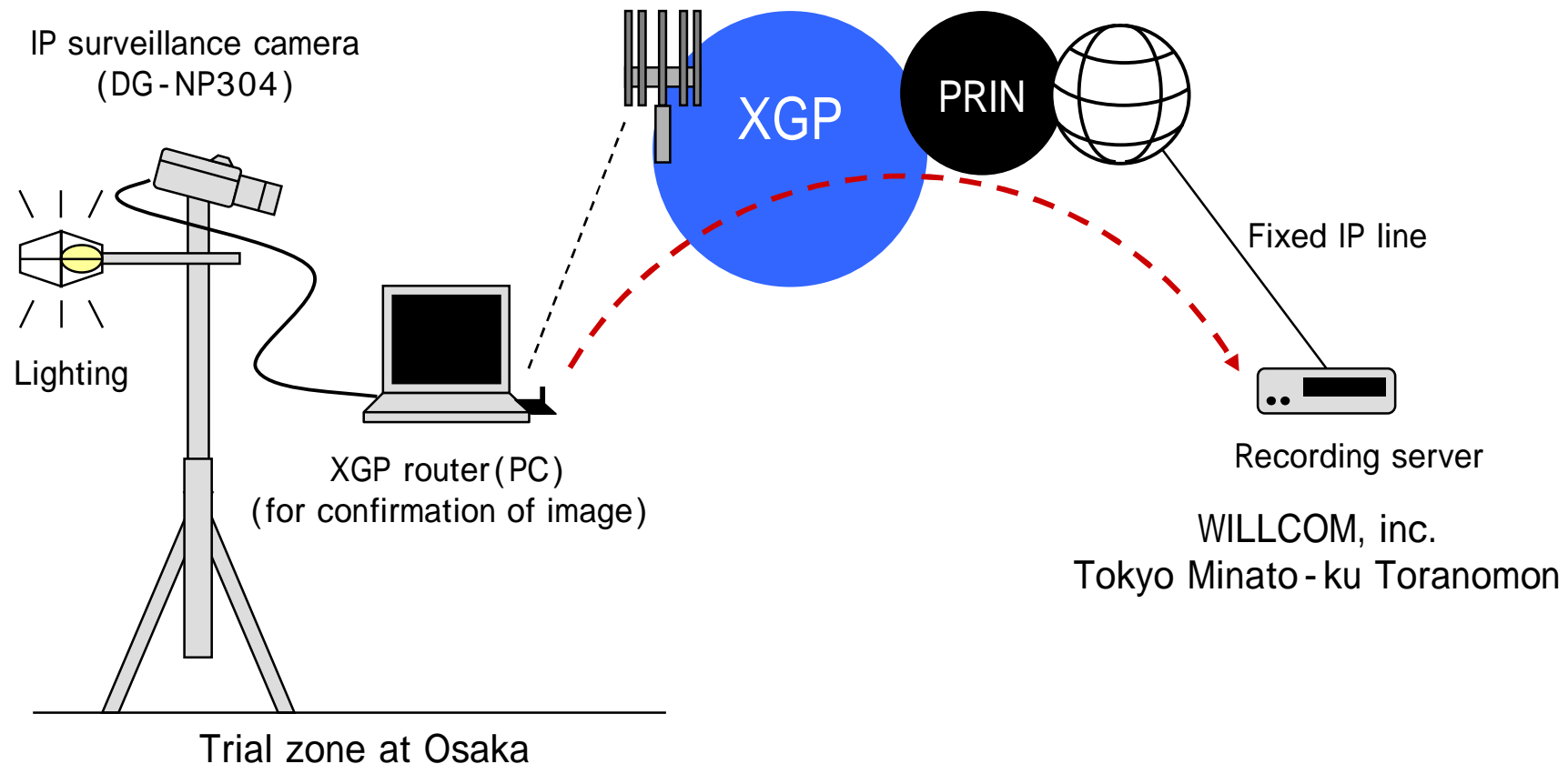
Temporary installed
IP surveillance camera



Experiment scenery by fixed point surveillance camera

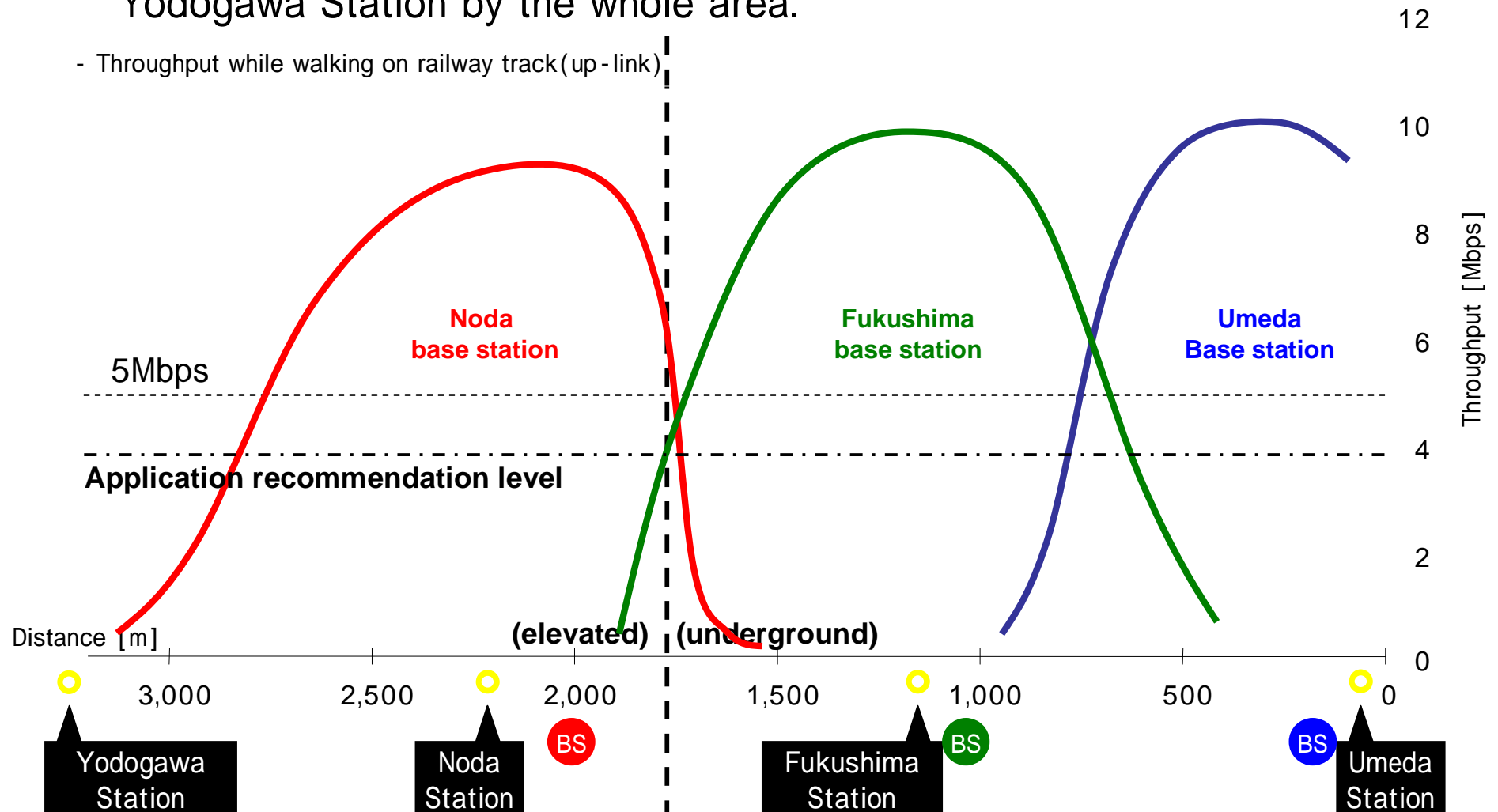
System configuration of application experiment

- HDVideo of which it took by temporarily setting up the surveillance camera in the tunnel was transmitted to the WILLCOM headquarters by way of the Internet connected by the XGP. And it was recorded in the recording server.



Throughput of fixed point (Up link)

- The throughput of 5Mbps or more is achieved from Umeda Station to Yodogawa Station by the whole area.



Application experiment: relay of image(HD-Video)

- The image of IP surveillance camera is relayed from seven places (railway track and platform), and the it is recorded in the remote place.

- Each point is throughput while walking on the railway track. (up-link) - The band limiting of 10Mbps is executed.

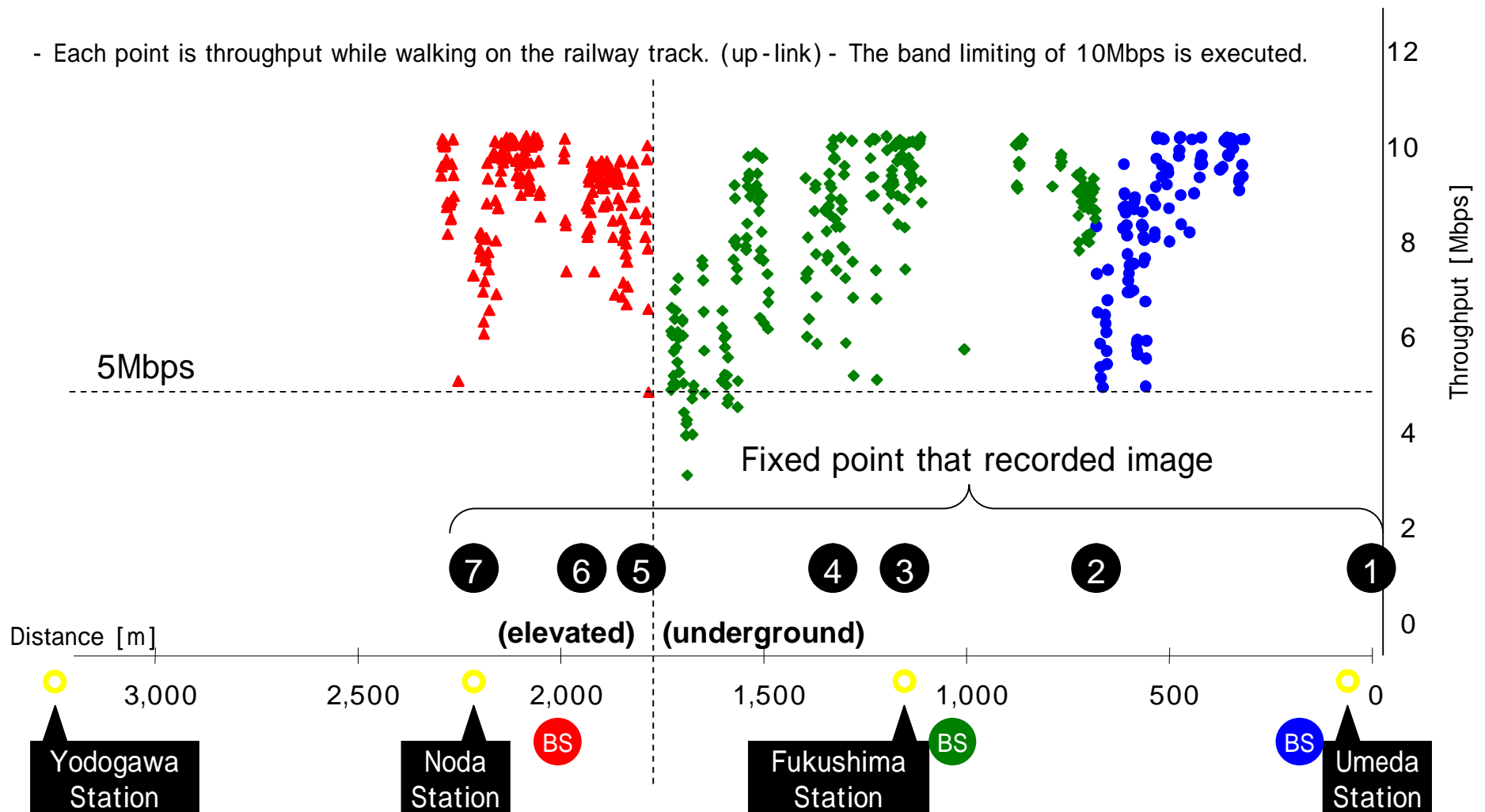


Image from fixed points



Image from fixed points

2009/12/17 02:17:53

Tunnel exit



2009/12/17 02:39:30

On railway track



2009/12/17 02:48:36

Noda Station



2009/12/17 02:50:17

Noda Station



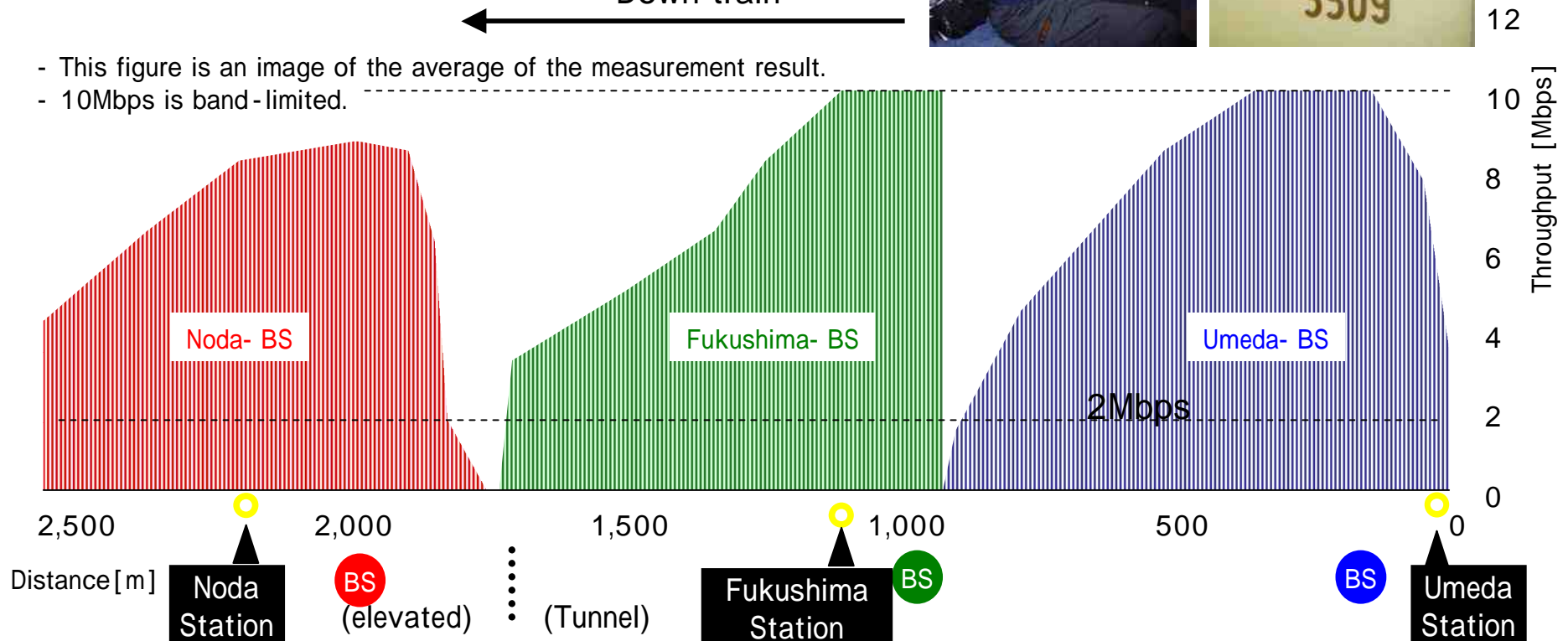
Throughput under movement

- It keeps data rate of 2Mbps or more except handover when the moving train.
- There is no stress of the user because the Internet doesn't disconnect it even if download stops temporarily when the handover.



← Down train

- This figure is an image of the average of the measurement result.
- 10Mbps is band-limited.



Summary

- The installation work of the base station to the railway facilities was able to be done promptly and safely, because Hanshin Electric Railway Co., Ltd. and WILLCOM jointly did this experiment.

The BWA network of an enough quality became possible by setting up one XGP base station in the vicinity of each station platform.

- Not only the platform but also anywhere that up-link of 5Mbps or more was able to be confirmed with stability.

This mean that the transmission of high-resolution like a HD-Video becomes possible from a wireless IP surveillance camera at anywhere.

- The throughput of 2Mbps or more was able to be confirmed, even if running train from tunnel to the elevated railway.

The passenger can use a comfortable high-speed Internet whenever it not only stops but also runs.

Both of two targets were achieved.