

Radio over Fiber (RoF) Technology

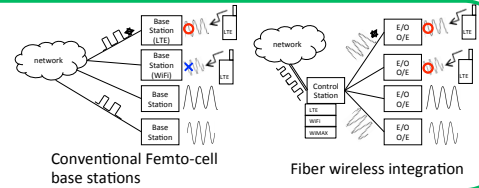
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Background

RoF (Radio over Fiber) is a technique to transmit analog radio frequency signal as optical intensity modulation using optical fibers which have low-loss and broadband property.

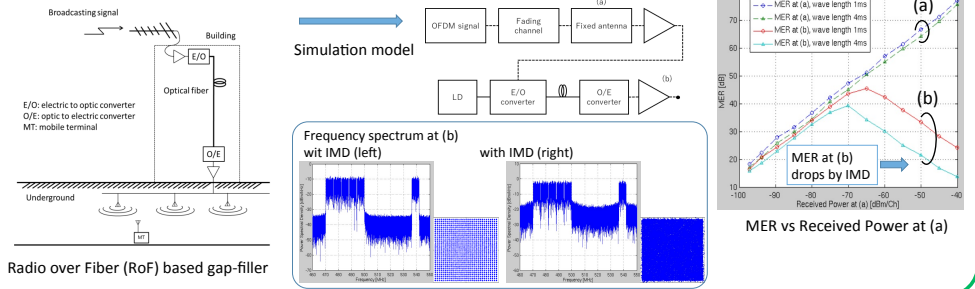
- Centralized operation of several small-cell base stations.
- reduction of maintenance cost, easily construct heterogeneous radio network, cooperative distributed antenna system, and large transmission capacity.



Gap-filler for High Definition Mobile Broadcasting

Radio over Fiber (RoF) is employed to compensate radio dead zone such as underground city and inside tunnel area. The signal transmitted by using RoF is suffered distortion caused by optical modulator.

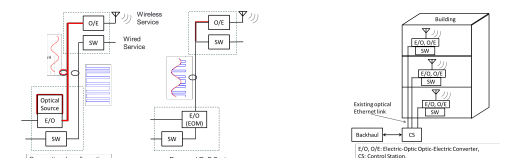
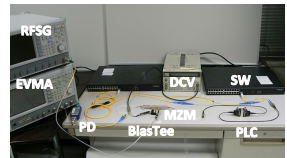
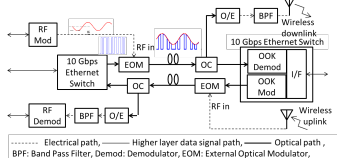
In this research, we evaluate the performance of an optical repeater system using radio over fiber for next generation DTTB system employing higher-order digital modulation by using computer simulation.



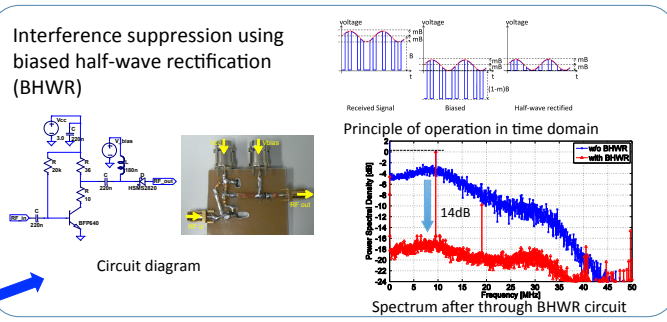
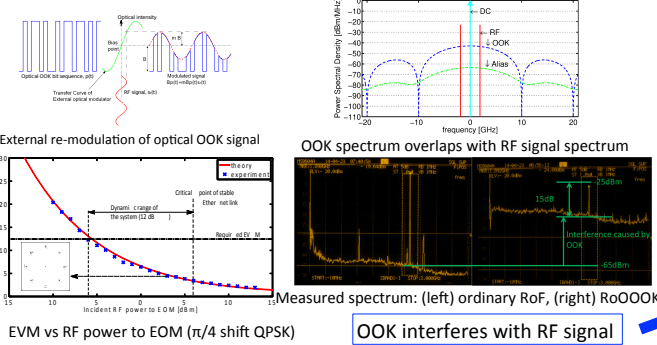
RoOOK (Radio over Optical OOK)

RoF is attractive but dedicated optical sources and fibers are needed.

Radio over Optical On-Off Keying (RoOOK) transfers optical baseband (BB) signal and radio frequency (RF) signal over single optical fiber channel.



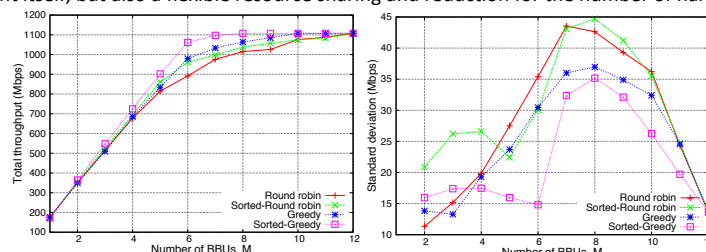
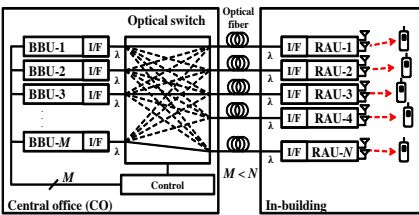
Radio over Optical On-Off Keying RoOOK



Centralized control and resource sharing

Optical switch working with load-balancing algorithm

As shown in the figure, a baseband unit (BBU) and remote radio unit (RAU) is no longer point to point connection. Optical switch enables us beneficial feature, not only reduction for the number of BBU equipment itself, but also a flexible resource sharing and reduction for the number of handover process.



Conclusion

We evaluate the throughput performance and deviation among BBU's usage. As the load balancing algorithms, Round robin and Greedy type, and their modified one are assumed. The Sorted-Greedy algorithm can reduce the number of BBUs by 33%. The Sorted-Greedy can achieve minimum SD. It is found that the offered load with higher throughput should be assigned to BBU in prior to the load with lower required throughput.

