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HYBRID SUBCARRIER MULTIPLEXING FLEXIBLE CROSS CORRELATION (FCC) OCDMA FIBER-WIRELESS ACCESS NETWORK

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PRODUCT DESCRIPTIONS

FCC-OCDMA code with Subcarrier Multiplexing (SCM) is developed and deployed on Fiber-Wireless access network. Hybrid Fiber-Wireless FCC-OCDMA network with future broadband allows high-mobility, high-speed internet access, low cost and adequately high number of subscribers with low optical received power. The feature of FCC-OCDMA SCM Fiber-Wireless can be applied in various industries and dense-populated neighbourhood for high speed telecommunication; HD-TV, video teleconferencing and internet-access in cities, fast-trains, and oil and gas industries.

NOVELTIES

- Novel FCC-OCDMA developed and applied to FiWi network system with subcarrier multiplexing technique.
- New encoder-decoder design for FiWi FCC-OCDMA network.
- FCC-OCDMA network for various applications.

APPLICATIONS

Fiber to the Home (FTTH)
- Desired bandwidth; triple play, HD-3DTV-based IPTV, Video on Demand (VoD), broadband internet services and VoIP, Fig. 1.
- Reliable transmission quality with high optical security .
- High-mobility and high-speed.
- Easier installation.

Automotive and Fast Train
- Solution for high capacity data transmission at high speed, Fig. 2.
- Wide bandwidth and high-speed for wide area coverage, Fig. 3.

Oil and Gas
- Enable high wireless data acquisition network infrastructure.
- Support various sensor applications; wide range of data on environmental conditions, oil reserve levels, and equipment performances and status, Fig. 4.
- Insusceptible to Electrometric Interference and Radio-Frequency Interference (EM/RFI) during long haul transmission.

PUBLICATIONS

1. **C. B. M. Rashidi**, S. A. Aljunid, F. Ghani, H. A. Fadhil and M. S. Anuar, (2014), "Design and Evaluation a New Class of Codes with Non-Zero Cross Correlation for Spectral Amplitude Coding Optical CDMA Systems", *Technics Technologies Education Management*, Vol. 9, No. 1, pp. 40-48. (IF= 0.414).
2. **C. B. M. Rashidi**, S. A. Aljunid, M. S. Anuar, Hilal A. Fadhil, F. Ghani, (2013) "PIIN Alleviation Based on the Flexible Cross Correlation (FCC) Code for SAC-OCDMA System," *Pensee Journal*, Vol 75, No. 11, pp. 2-10 (IF= 0.063).
3. Nordin J. M, S. A Aljunid, Rahim R. A, Anuar M. S, Arief A. R, Ahmad R. B, Saad M. N,(2013), "Performance Evaluation of FiWi Network Based On SCM-Optical Code Division Multiple Access Architecture," *Optik 124*,pp. 4046-4051 (IF=0.51)

INVENTION ADVANTAGES

- "Fiber wireless (FiWi) facilitates "last mile" fast wireless connectivity data transmission to subscribers.
- Increase the number of users and inherent security of data transmission.
- Suppression of Multiple Access Interference (MAI) through AND-subtraction detection, Fig. 5 and 6.
- Utilizing broadband access network allows high-mobility and cost-effective.
- Enable high number of subscribers through the phase induced intensity noise suppression at high speed and optimum power.
- Environmental friendliness: - Reduce radiation exposure for long haul transmission

COMMERCIALIZATION POTENTIALITIES

- Successfully developed FiWi FCC-OCDMA prototype design.
- Can be commercialized in telecommunication (FTTH), fast train and oil and gas Industries.
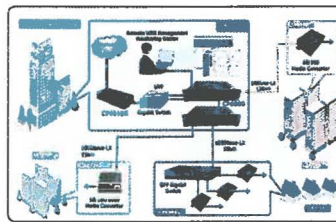

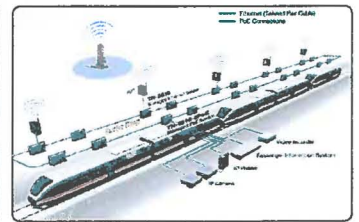Fig. 1 Telecommunication (FTTH) Application

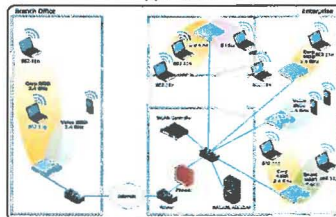Fig. 2 Train Application

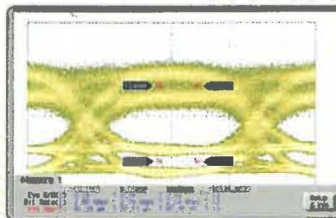Fig. 3 Dense Populated Area Application

Fig. 4 Oil and Gas Application
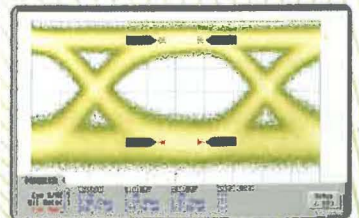

Fig. 5 FCC-OCDMA Eye Pattern Before Subtraction

Fig. 6 FCC-OCDMA Eye Pattern After Subtraction