komunikasi antara *CPE* dengan *end user* menggunakan teknologi *Wi-Fi*. Sistem *fixed WiMAX* dirancang menggunakan frekuensi 3,3 GHz dengan channel bandwidth 3,5 dan ditentukan *system gain* yang tepat agar diperoleh *area availability* yang baik pada daerah cakupannya. Proses penentuan kapasitas, jumlah sel dan *coverage* masing-masing sel dilakukan berdasarkan kondisi dan kebutuhan real di kota Balikpapan. Kebutuhan *bandwidth* seluruh perkantoran dan sekolah-sekolah di Kota Balikpapan adalah sebesar 965,392 Mbps. Kebutuhan layanan, *QoS* dan kondisi kanal pada masing-masing pengguna sangat berfariasi sehingga pada tesisi ini digunakan teknik modulasi adaptif

Pada penelitian ini dihasilkan struktur jaringan yang terdiri dari kombinasi *mikrosel* (untuk wilayah *urban* dengan luas sel 4.116 km^2 sebanyak 19 sel) dan *makrosel* (untuk wilayah *suburban* dengan luas sel 21.900 km^2 sebanyak 20 sel). Pada wilayah *urban* agar diperoleh daerah cakupan sel dengan sinyal penerimaan yang baik, digunakan base station dengan tinggi 40 meter, Tx power 30 dBm sedangkan pada wilayah *suburban* digunakan tinggi base station 50 meter dan Tx power 43 dBm.

Kata kunci : *WiMAX 802.16-2004*, Struktur Jaringann OFDM, AMC, *Coverage, Capacity*

ABSTRACT

One of the long-term developments of Balikpapan is the implementation of good governance with the city management information systems. To support this development, a *blueprint of broadband services in the city of Balikpapan needs to be designed. The broadband services are expected to be able to cover the entire city of Balikpapan which has an area of 503.30 km^2, consisting of 87 offices and 175 schools.*

This thesis is to design the blueprint of broadband services to support the development of Balikpapan. F*ixed WiMAX technology* is selected *because the scope of the cell radius is able to reach* a distance of *50 km with the ability to access up to 75 Mbps. This technology is implemented as WiMAX and wireless backhaul networks* so *that* this *can expand* the *coverage and increase the capacity.*

This thesis attempts to *design a network structure that connects the base station to the link point to point and point to multipoint base station that connects* the base station *to some outdoor CPE units in offices and schools. Some offices and schools implement a system of communication between the* CPE and *end users* using *Wi*-Fi *technologies. Fixed WiMAX systems are designed using the frequency* of *3.3 GHz with channel*