

ABSTRACT

Communication system depends on bandwidth and power efficiency. Bandwidth efficiency can be described by ability of modulation scheme to accomodate data with finite bandwidth. Whereas, power efficiency can be depicted as sistem ability to deliver information with low power.

Bandwidth necessity, with high throughput can be obtained by design of flexible and adaptive transmission mode. This selection of transmission mode can increase power efficiency and spectrum resource. Afterwards, adaptive coding and modulation (ACM) is introduced in DVB-S2 standard for profile of broadband satellite service network that replace conventional DVB-S with constant coding and modulation (CCM).

In this final project, system test is analyzed based on influences from aspect of frequency spectrum use (C-band and Ku-Band), and also channel condition (clear sky and heavy rain). This test will generate the variation of loss propagation, so that it can cause variation of power level at receiver.

In simulation, for each modulation type (QPSK, 8PSK, 16APSK, 32APSK), FEC of $\frac{1}{2}$ code rate is giving the best performance with the smallest bit error rate parameter. In analyzing transmit power need at certain BER target, low modulation order will need lower power transmit than high modulation order.

High modulation order has advantage in bandwidth. This modulation type needs smaller bandwidth than modulation with low modulation order. So, trade off between power and bandwidth efficiency can be obtained by applying adaptive coding and modulation. In clear sky propagation condition, ACM format will tend to select the high modulation order to ensure availability standard. It can increase of E_b/N_0 and give lower usage of bandwidth. While the link is in bad condition of propagation, ACM will choose the small modulation in order to maintaining information quality, but it must use larger bandwidth.