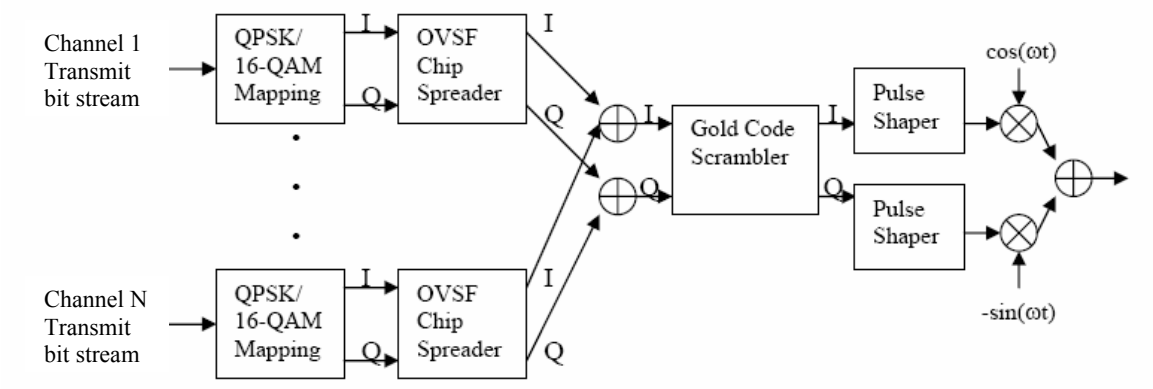
Modulating Signal Description

There are two separate systems described in this application: (1) an HSUPA demonstration system using a prototype fixed mobile system transmitting to a commercial Motorola base station, and (2) a UMTS/HSDPA demonstration system using a commercial Motorola AXPT (High Speed Access Point) transmitting to and receiving from several commercial UMTS/HSDPA subscriber devices (laptop PCMCIA cards).

The HSUPA system only requires one 5MHz band for uplink, while the UMTS/HSDPA system requires two 5MHz bands (one for downlink and one for uplink).

For the HSUPA system, the transmit signal is modulated according to the 3GPP Release 6 specification for the E-DPDCH, E-DPCCH, and DPCCH channels (3GPP TS 25.213). Each channel can be represented as the summation of one or more subchannels carrying BPSK modulation symbols and spread to the 3.84Mcps chip-rate using an Orthogonal Variable Spreading Factor (OVSF) code.

All subchannels are summed together and passed through a Gold Code scrambler. A root-raised cosine filter with rolloff factor $\alpha = 0.22$ is used for pulse shaping. The final result is modulated by multiplying the I component by $\cos(\omega t)$, the Q component by $-\sin(\omega t)$, and summing the results as shown.



For the UMTS/HSDPA system, the transmit signals are modulated according to the 3GPP Release 5 specification. The above figure can also generally represent the UMTS/HSDPA system.