System model of Transmitter

$$\mathbf{m} \longrightarrow ASCII \xrightarrow{\mathbf{u}} QPSK \xrightarrow{\mathbf{a}} Pilots \xrightarrow{\left[\beta \ \mathbf{a} \ \beta\right]} p(t) \xrightarrow{\mathbf{y}(t)} \operatorname{Re}\left\{y(t)e^{\omega_{c}t}\right\} \xrightarrow{s(t)}$$

System model of Channel

$$s(t) \longrightarrow h(t) \longrightarrow \bigoplus r(t)$$

$$n(t)$$