WCS-MMDS Transceiver
520006-1

Description Of Operation

This product is a two-way microwave transceiver designed to operate over the WCS band (2305-2317 MHz) as the transmitter and over the MMDS band (2500-2686 MHz) as the receiver. The receive and transmit chains of the design are combined utilizing proper dilpexing and filtering at each respective band. There is one common RF port for both RF Receive (Rx) band, and RF Transmit (Tx) band, and one common IF port for the Rx IF band and Tx IF band. This product is designed to operate with cable-ready type Modems in order to provide high speed internet access to the consumers. Modem upstream IF band is 28.062-40.062 MHz and downstream IF band is 222-408 MHz. As an out door unit, this transceiver is connected to a directive Antenna, which is designed to cover both Rx and Tx bands. The Antenna gain of a typical installation is about 17 dBi.

The transmit section in this transceiver is a dual conversion frequency translator. The modem IF input frequency band of 28.062-40.062 MHz is unconverted to an intermediate IF frequency of 162 to 174 MHz, which then gets unconverted to the desired RF transmit band of 2305-2317 MHz. The unit is capable of up to 24 dBm output 1-dB compression point at approximately 28 dB of total gain.

The local oscillator (LO) used in the transmit section design is an S-Band oscillator at 2143 MHz phase locked to a highly stable Temperature Compensated Crystal Oscillator (TCXO) and exhibits a long term stability of ±10 KHz over the operating temperature range of –30 deg C to +70 deg. C. This LO is used in the second upconversion process, which yields the Tx RF band. The 133.938 MHz LO used in the first upconversion process is derived from the 2143 MHz S-Band LO by dividing it by 16.

The Transmit block diagram is shown below. It shows the various gain, mixing, and filtering blocks that make up this chain. All filters were specifically designed and placed appropriately along the transmit chain to achieve the desired rejection masks in order to comply with internal and external interfering sources and emission requirements.

A QPSK signal of up to 6 MHz wide within the frequency band of 28.062-40.062 MHz is provided from the Hybrid Networks modem, model number N231. The output is adjusted in 1 dB steps from 8 dBmV to 58 dBmV into the transceiver, which in turn gets up converted twice for the desired RF transmit band of 2305-2317 MHz.

In order to eliminate aggregate noise power at the receive hub due to emitted broad band noise from all the subscribers connected to the service, and thus maintain adequate signal quality, the transceiver utilizes a blanking feature which allows it to turn off the Transmitter when not in use. The transmitter is enabled by a predetermined minimum signal received from the modem.

A typical install at a subscriber's site includes this modem, the transceiver, the antenna, a plug-in power supply, cables and any additional powers dividers/splitters. The installer mounts the transceiver with the Antenna at a rooftop, and aligns the antenna towards the service provider's hub for maximum signal quality. A cable run connects the transceiver with the indoor modem. This establishes the link between the transceiver and the hub. Sufficient link budget margin should be allowed to maintain link between the subscriber's site and the service provider's hub.

Integrated WCS/MMDS Transceiver Block Diagram
(520006-1)
(Transmit/Upstream)