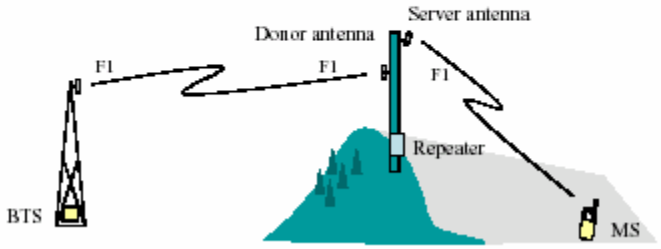
1.2.1 Channel Selective Repeaters

Channel selective repeaters are mainly used for coverage of dead zones, shadows, in-building coverage or other areas with inadequate signal strength. The output power of a channel selective repeater is sufficient to cover an area shadowed by a building or other obstacle.

In a channel selective repeater each carrier is separately filtered, amplified and retransmitted. A channel selective repeater from Avitec can have 1 to 4 channels.



A channel selective repeater system consists of one repeater unit complemented with one antenna facing the donor BTS and another antenna directed towards the coverage area. The repeater site needs to be located where the BTS signal strength is large enough to be usable by the system. Ideally the repeater's donor antenna should have line of sight (LOS) contact with the BTS antenna. If the signal strength is high enough, LOS may in some cases not be necessary.

The signal generated by the BTS is picked up at the repeater site via the donor antenna. The repeater filters and amplifies the signal before retransmitting it at the same frequency over the server antenna.

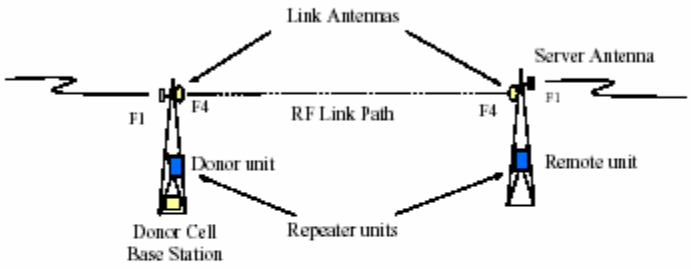
The isolation between the antennas at the repeater site has to be high in order to prevent degradation of signal quality and risk of oscillation. Ways to achieve this can be large physical separation between the antennas, usage of highly directional antennas with good front-to-interference ratio or external shielding between the antennas. Another option is to use a Frequency Translating repeater (see description below).

Channel selective repeaters may have higher output power per carrier and typically have better spurious rejection than band selective repeaters. The maximum output power per carrier can be several watts.

1.2.3 Frequency Translating Repeaters

A frequency translating repeater provides output power levels comparable to a base station. The concept allows for high gain without the high antenna isolation required for channel selective repeaters.

The frequency translating repeater consists of two units; one donor unit and one remote unit.

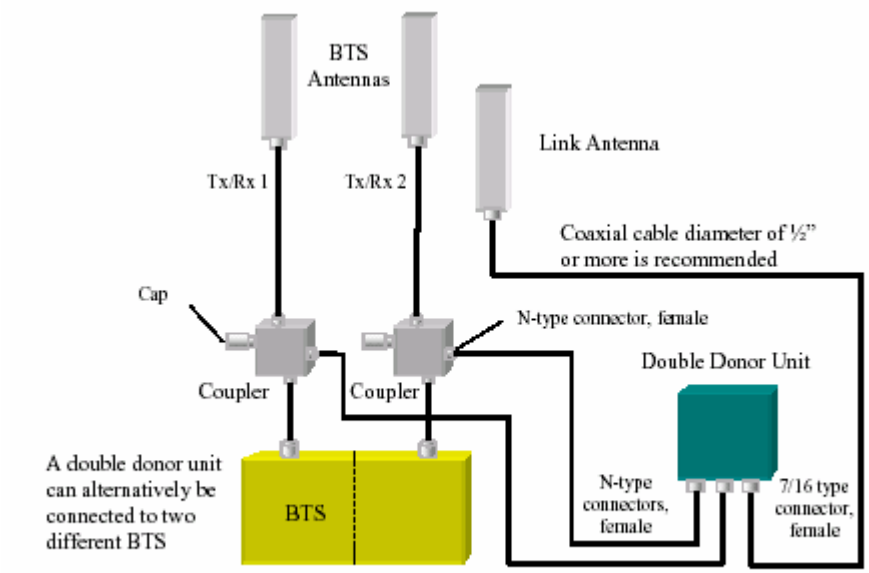


The donor unit is mounted at the base station site where the signal enters the repeater via a directional coupler. In the donor unit, the signal is translated into another frequency, the link frequency, amplified and transmitted via a link antenna. At the remote site, a link antenna picks up the signal and feeds it to the remote unit. The signal is translated back into the original frequency and retransmitted over the server antenna.

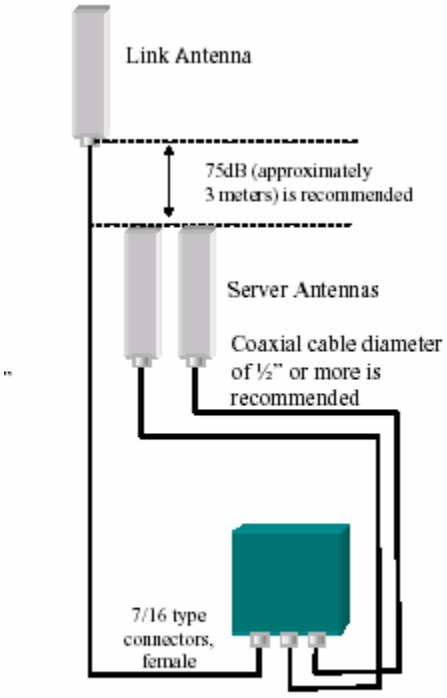
Only 2 guard channels are needed between the radio frequency and the link frequency.

The isolation between antennas at the remote site seldom needs to be more than 75 dB. This value that can be achieved with a limited antenna displacement, often as low as 3 meters. The relatively modest isolation requirement allows the use of omni-directional antennas for the service area.

Important applications for frequency translating repeaters are road coverage, rural coverage or for transferring capacity from a base station to another area.



Site Installation for Frequency Translating Repeater – Double Donor Unit



Site Installation for Frequency Translating Repeater – External Combiner Unit (ER)

FCC ID: PRQCSFT1922 Operational Description

CSFT 1922	
System	GSM/EDGE 1900 MHz (PCS 1900)
Channels	1-2 channels
Bandwidth	The operational bandwidth is 60 MHz and the channels can be set with 200 kHz channel spacing
Output Power	Per carrier downlink (ER): +43 dBm GSM/GMSK +40 dBm EDGE / 8-PSK average power
	Per carrier downlink (IR): +40 dBm GSM/GMSK +37 dBm EDGE / 8-PSK average power
	Per carrier uplink (ER/IR): +37 dBm GSM/GMSK +34 dBm EDGE / 8-PSK average power
Repeater Gain	Downlink (ER) 78 – 108 dBm, adjustable in 1 dB steps
	Downlink (IR) 75 – 105 dBm, adjustable in 1 dB steps
	Uplink (ER) 78 – 108 dBm, adjustable in 1 dB steps
	Uplink (IR) 75 – 105 dBm, adjustable in 1 dB steps
Power Supply	The power supply is 110/230 VAC, 50/60 Hz or 48 VDC, and the power consumption is 100 W typical / 200 W maximum