Note 2000/008/ **18/04/99 Issue 1**

Systems Operations Division

INFORMATION NOTICE 9

Subject: USE OF UPPC (UP-LINK POWER CONTROL UNITS)

GENERAL

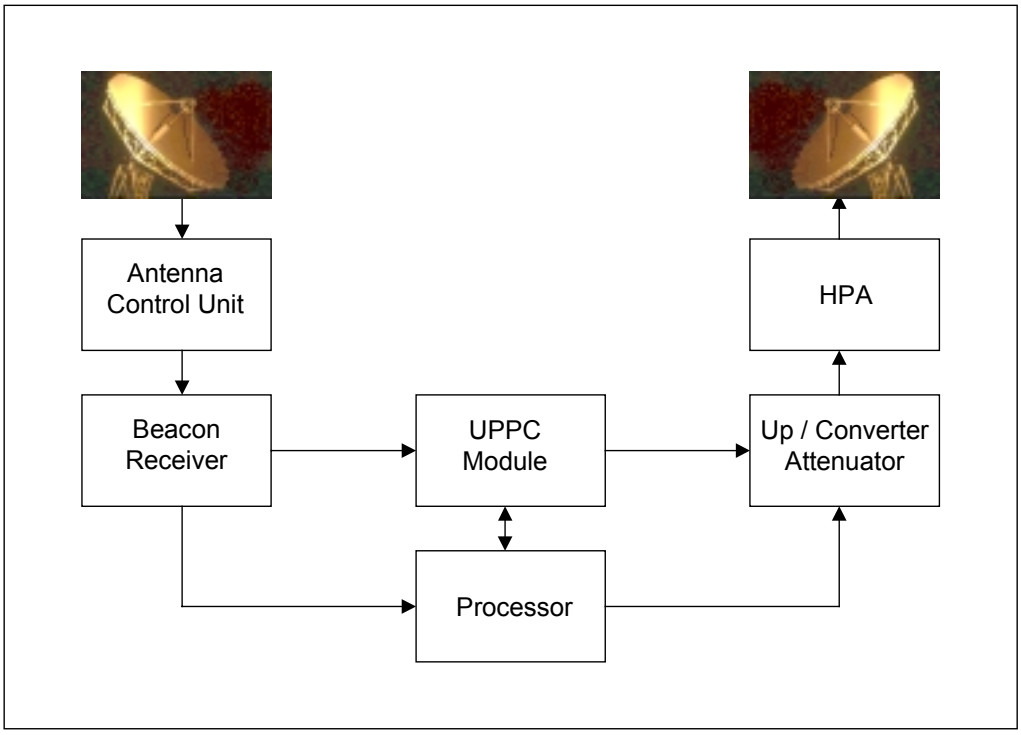
UPPC (Up-link Power Control) systems provide automatic EIRP adjustment for the carriers transmitted by a satellite earth station, to compensate for propagation effects (rain, snow, etc). UPPCs maintain the EIRP level at the receive antenna of the satellite within typically $\pm$ 1.5 dB by making the necessary transmit power adjustments.

The operating principle of these devices consists in first memorising the clear sky down-link power level of the satellite beacon and the earth station up-link power level settings. To maintain constant up-link power at the satellite receive antenna, the system increases or decreases the transmitted EIRP inversely to the beacon level variation caused by the adverse weather conditions.

Typically, UPPCs receive a varying DC voltage signal from the beacon receiver. This varying DC voltage signal, representing a change in the beacon signal strength, is linearised and applied to the EIRP control algorithm. A conversion factor compensates for the difference between the up-link frequency and the beacon frequency. The resulting value of the signal loss after application of the conversion factor is used to determine the appropriate up-link EIRP level adjustment relative to the clear sky value.

EIRP level adjustments are usually performed by controlling the attenuation stage of the earth station up/converter: for clear sky conditions (nominal level of the output carrier) the attenuator is set to the maximum attenuation. During a fade, the attenuation will be reduced, to increase the EIRP and maintain the required input levels at the satellite. At the re-establishment of nominal propagation conditions the attenuator will be set again to the nominal value, thus reducing the transmit EIRP accordingly.

UPPCs typically compensate up-link fades in the range from 3 to 6 dB.



EUTELSAT REQUIREMENTS

EUTELSAT requires earth stations operators to respect the following guidelines for the implementation and use of UPPC:

TECHNICAL REQUIREMENTS

- UPPC systems shall be based on the receive satellite beacon only.
- HPA ratings shall be dimensioned in such a way there is sufficient margin to avoid spectrum re-growth e.g. for digital television carriers. The nominal EIRP shall include already the normal propagation margins derived from then ITU climatic zones, UPPC is meant to provide additional margin only.
- Earth stations which are not fully meeting the EUTELSAT Earth Station System Standards (EESS) in terms of transmit sidelobe patterns or polarisation discrimination will not be allowed to use any form of UPPC.
- The UPPC range of operations is normally limited to about 6 dB.

OPERATIONAL REQUIREMENTS

- Prior to obtaining EUTELSAT approval for the use of UPPC, a full description of its mechanism shall be provided.
- EUTELSAT will require full testing of the UPPC, usually during the initial full line-up tests prior to commencement of operations.