

AGC & ALC in IBUCs

All IBUC models include selectable Automatic Gain Control (AGC) & Automatic Level Control (ALC). The original purpose for implementing AGC was to minimize gain variation over temperature. However, due to the characteristics of GaN amplifiers, AGC has taken on a new importance. It is essential for realizing the efficiencies of new adaptive coding technologies used in network hubs.

Even with digital temperature compensation, the gain of a Block Upconverter varies over temperature. AGC maintains constant gain through the RF unit by measuring & comparing input level and output level. If the input level to the BUC is intentionally raised or lowered, the output level will also move in lockstep with it since the gain is constant.

How does this play into operation with a GaN amplifier? The power transfer curve of a GaN amplifier is not linear. A 1 dB change in input level does not result in 1 dB of output level. Several of the new network hub modems use adaptive modulation coding, switching to the best modcod to optimize transmission efficiency. The algorithm expects the amplifier to deliver predicted gain steps in a 1-to-1 relationship. Since the GaN amplifier does not have a linear power transfer curve, the results are undesirable – lost bits of information. By linearizing the power transfer curve, the AGC function corrects the problem.

In other operations the user may prefer Automatic Level Control (ALC) which keeps the output power constant to within 1dB p-p even if the input level changes. For example, an SCPC site with a long IFL cable run exposed to broad ambient temperature variations. Losses in the cable will vary with temperature. The IBUC monitors input levels & output levels, compensating for variations by adjusting gain to deliver a constant output power level.

Sensors throughout the IBUC are coupled to a powerful microprocessor. Unlike other BUCs, the IBUC includes an additional gain stage for gain compensation. All IBUC models, both GaAs & GaN, include the AGC/ALC feature which is selectable through any of the M&C interfaces.



Terrasat Communications engineers Intelligent BUCs, or IBUCs, with solid state power amplifiers (SSPA) that enable satcom operators to install, configure, & monitor with extreme ease & confidence. IBUCs bring advanced features & performance to C-band, X-band, Ku-band, & Ka-band satellite earth terminals & VSATs worldwide.

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