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SIMULATED EFFECTS ON SBAS SIGNALS CAUSED BY A TRAVELING WAVE TUBE AMPLIFIER

**Abstract**

With the upcoming next generation of Satellite-Based Augmentation System (SBAS) services, additional upgrades to the corresponding ground infrastructure will also be necessary. The design of every SBAS contains a ground-generated Global Navigation Satellite System (GNSS) signal source which is up-linked to an in-orbit platform. This means the quality of the signal as generated and passed through the ground station amplification chain is directly related to the signal quality as received by the end user. To reduce risks and increase possible SBAS signal quality, it is possible to simulate the various ground station components to gain insight into their effect on the signal. An important component is the high-power amplifier, commonly in the form of a Traveling Wave Tube Amplifier (TWTA). The TWTA is modeled as a conventional filter and the resulting simulated signal response is evaluated using the correlation loss and the S-curve bias metrics. It is found that a higher chip rate is less susceptible to effects due to non-linear amplification. Similar simulations make it possible to simulate the entire ground station. This reduces risk for both the SBAS operator and the end users.