

Required Increase in KMYT Effective Radiated Power to Compensate for Reduction in Antenna Height

The Problem

From the beginning, the conversion of KMYT from operation on Channel 42 to operation on Channel 34, as required by the post-Incentive Auction spectrum repack has been fraught with challenges and problems. The tower on which the KMYT antenna is installed is in an overloaded condition, and it has been quite difficult to find a safe way to install the larger antenna required for operation on Channel 34 while simultaneously bringing the tower design into conformity with the latest required structural standards. This situation is evident from a structural engineering report recently provided by Tower Engineering Company (TEC). While it was planned to install the replacement KMYT Channel 34 antenna with its radiation center at the same height as the original Channel 42 antenna, TEC found that the tower structure could not support such an installation and that the antenna needed to be moved 6.1 meters (about 20 feet) lower on the tower to accommodate the stresses while meeting the requirements of the ANSI/TIA-222-G standard.

The Solution

The KMYT Channel 34 RF transmission system originally was designed based on an antenna Radiation Center Height Above Ground Level (RCAGL) matching that of its current installation on Channel 42. That is, the antenna installation was planned for an RCAGL value of 355.7 meters (1167 feet). The recent TEC finding that the antenna had to be installed at 349.6 meters (1147 feet) for structural reasons required that the RF transmission system be redesigned to compensate. The objective of the redesign was to maintain the KMYT predicted noise-limited contour (PNLC) at the same location as the contour resulting from the currently-authorized construction permit issued to KMYT.

To match the location of the contour from the new, lower RCAGL height with the contour from the currently authorized RCAGL height, an increase in effective radiated power (ERP) was necessary. The two contours were matched using contour studies conducted with the EDX Signal software application. The distance values from the transmitter site to the respective contours were compared at 360 points, at 1-degree bearing intervals around the compass. The ERP was adjusted to reach the minimum of the mean value of the contour-distance differences at all 360 bearings. The ERP required for a contour match when using the lower antenna location is 812.5 kW, versus 770 kW with the antenna at the original RCAGL value.

For completeness, please note that the antenna manufacturer and model number have been changed in the current construction permit modification application.